

THE MINISTRY OF
AGRICULTURE AND FISHERIES

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The Ministry of Agriculture & Fisheries

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Ministry, 1920-1927.*

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TO MY COLLEAGUES IN THE MOST
HUMAN OF ALL DEPARTMENTS.

F. L. C. F.

PREFACE

THIS book is an attempt to describe the work of a Government Department which differs in certain respects from any other. It is concerned not with a particular function of government, but with all, or almost all, the functions of government in relation to the industries of Agriculture and Fishing. The work of the Ministry of Agriculture and Fisheries covers therefore a very wide field. It has functions in relation to education, to research, to labour, to Local Government and Public Health, and to statistics, all of which in their broader aspects are administered by other Government Departments. The Ministry is expected by the agricultural and fishing industries to act as their advocate in all their relations with the State, and to be the medium for all their difficulties and troubles.

Lord Milner, when he was a member of the War Cabinet, used to say that the War against Germany was nothing compared to the War between the Departments. The Ministry of Agriculture and Fisheries must perforce trench on the preserves of other Departments, but, as befits the representative of peaceful occupations, it tries to avoid hostilities, and seeks to secure its ends in the spirit of that blessed word Co-operation.

The Ministry has a varied collection of clients to serve. In addition to landlords, tenants and

P R E F A C E

workers in agriculture, trawler owners and line fishermen, it has dealings with the clergy in relation to their tithe and glebe, with the Universities and Colleges in relation to their landed property as well as in relation to their educational and research work, and with the world of science in many branches.

The Ministry has not merely to administer Acts of Parliament, but it is also its duty to suggest and initiate schemes which will assist in the development of agriculture and fisheries in the national interest. This book endeavours therefore to describe not only the statutory duties of the Ministry, but also to give an outline of the various schemes which are in progress, and of the circumstances which have led up to them.

At the same time no attempt has been made to write a history of agriculture or of fisheries, and no reference is made to those large questions of national agricultural policy, which form the subject of political controversy. I have confined myself to trying to draw a picture of what the Ministry does, in the hope that it may be of some interest to those it serves, whether they are agriculturists or fishermen or the general public as consumers of food and as taxpayers.

I have to express my indebtedness to many of my colleagues for their advice and assistance and particularly to Mr. Henry Maurice for the chapter he has contributed on the work of the Fisheries Department of the Ministry.

F. L. C. FLOUD.

May 18th, 1927.

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THE MINISTRY OF,
AGRICULTURE AND FISHERIES

Chapter I

ORIGIN AND HISTORY

AGRICULTURE and fishing are the two oldest industries of the human race, but, with the exception of the Air Ministry, the Ministry of Agriculture and Fisheries is the youngest of the Departments of State which are represented in the Cabinet. On the other hand, Agriculture and Fisheries are the only industries which have a Cabinet Minister of their own to represent them in the Government.

The Department came into existence in 1889 by virtue of the Board of Agriculture Act, 1889. The responsibility for the fishing industry was added to its duties by the Board of Agriculture and Fisheries Act, 1903, and it was reconstituted as the Ministry of Agriculture and Fisheries by the Ministry of Agriculture and Fisheries Act, 1919.

But long before this there had been a Board of Agriculture, though it was not a Government Department in the strict sense of the term. It was a Society founded by Royal Charter and supported by an annual grant from the Exchequer, and its true successor is the Royal Agricultural Society of England rather than the Ministry of Agriculture. At the same time, some account of its establishment and work is not inappropriate to the subject of this book, and it is of interest in

relation to the general problem of the attitude of the State to the industry of Agriculture.

The founder of the old Board of Agriculture was Sir John Sinclair, Bart. (1754-1835), a Scottish landlord who owned an estate of 100,000 acres in Caithness. He was one of the most remarkable and industrious men of his time, a Member of Parliament, an eminent financier, the author of 367 publications on every conceivable subject of public utility, the patron of Macadam, the road-maker, and of Colonel Shrapnel, the inventor of case shot, the founder of the Scottish herring trade and above all an enthusiastic agricultural improver. He is also notable as having introduced into the English language from Germany the words "statistics" and "statistical." His principal publication was the "Statistical Account of Scotland" in twenty-one volumes, which he compiled from information collected from the parish ministers in reply to a series of 160 questions under the heads of (1) Geography and Natural History, (2) Population, (3) Productions and (4) Miscellaneous Subjects. He was also the founder of the British Wool Society, which under his direction established the Cheviot breed of sheep all over the North of Scotland, and increased by many millions the annual value of British sheep.

Sir John Sinclair's experience in the development of his own estate and his study of agricultural conditions throughout Scotland had convinced him that there would be great advantage in the establishment of a national corporation which would be responsible for collecting information as to the best farming

methods and distributing it for the benefit of those who were more backward. He pressed this project on Mr. Pitt but was unable to obtain his support until 1793. In that year there was a serious financial crisis caused by a shortage of currency, and Sir John Sinclair's services in connection with an issue of Exchequer Bills, which rapidly restored commercial confidence, were so greatly appreciated by Mr. Pitt that he agreed in return to support the establishment of a Board of Agriculture if the House of Commons was generally favourable to the idea.

Sinclair's plans for the establishment of the Board had been discussed with Arthur Young, who was sceptical of success. He bet Sinclair a set of his *Annals of Agriculture* against a set of the *Statistical Account of Scotland* that the project would not be successful. When Sinclair informed him that he had an appointment with Mr. Pitt and that Young might lose his bet and had better send his books to the binder, Young replied in terms which are reminiscent of more modern agricultural grumbles. "You are going to see Mr. Pitt and I am to lose the wager ; when you come from Mr. Pitt, I shall have won it. Pray don't give Ministers more credit than they deserve. In manufactures and commerce you may bet securely ; but they never did and never will do anything for the plough. Your Board of Agriculture will be in the moon. If on earth, remember I am to be Secretary."

Having secured Pitt's support, Sinclair brought the proposal before the House of Commons in the following resolution :—

"That an humble Address be presented to his

Majesty, entreating that his Majesty would be graciously pleased, to take into his royal consideration, the advantages which might be derived by the public, from the establishment of a Board of Agriculture, and internal improvement.

“ Humbly representing to his Majesty, that though in some particular districts, improved methods of cultivating the soil are practiced, yet that, in the greatest part of these kingdoms, the principles of agriculture are not yet sufficiently understood, nor are the implements of husbandry, or the stock of the farmer, brought to that perfection of which they are capable.

“ That his faithful Commons are persuaded, if such an institution were to take place, that such inquiries might be made into the internal state of the country, and a spirit of improvement so effectually encouraged, as must naturally tend to produce many important national benefits, the attainment of which his Majesty has ever shown a most gracious disposition to promote; and in particular, that such a measure might be the means of uniting a judicious system of husbandry, to the advantages of domestic manufacturing industry, and the benefits of foreign commerce, and consequently of establishing, on the surest and best foundations, the prosperity of his kingdoms.

“ And if his Majesty shall be pleased to direct the institution of such a Board, for a limited time, to assure his Majesty, that his faithful Commons will cheerfully defray any expence attending the same, to the amount of a sum not exceeding £3,000.”

At the same time he distributed a memorandum

setting out his plan of work for the Board and containing an estimate of its expenditure. This memorandum opened with words which again illustrate the unchanging sentiments of the British farmer. "It has long been justly complained of that while every attention has been paid to trade and every encouragement given to commercial industry, agriculture has been totally neglected."

The resolution, in spite of somewhat lukewarm support from the Government and active opposition from Fox, Sheridan and Grey, was carried by 101 votes to 26, and on August 23rd, 1793, the Board or Society for the encouragement of Agriculture and Internal Improvement was constituted by Royal Charter.

King George III, himself an active farmer and a contributor to Arthur Young's *Annals of Agriculture* under the name of Ralph Robinson, became the Founder and Patron of the Board, which was to consist of a President, to be elected annually, sixteen *ex-officio* Members and thirty Ordinary Members, together with an unlimited number of Honorary and Corresponding Members, a Treasurer, a Secretary and two or more Surveyors for examining into the state of the husbandry of the kingdom. The *ex-officio* members included the great officers of State, the two Archbishops, the Bishops of London and Durham, the Speaker of the House of Commons, the President of the Royal Society, the Surveyor-General of Woods and Forests, and the Surveyor of Crown Lands. The original Ordinary Members consisted of most of the principal agricultural landowners, including Coke of Holkham, and the

Charter appointed Sir John Sinclair as the first President and Arthur Young as Secretary. The salary of the Secretary was fixed at £400 a year, which Young considered far from adequate, especially when he found that he was expected to be in constant attendance except during August, September and October, a month at Christmas and three weeks at Easter, and that he had to do his work in a room in Sir John Sinclair's private house, which he had to share with the Under-Secretary and clerks.

The first meeting of the Board was held on September 4th, 1793, when Sir John Sinclair delivered an inaugural address. He laid most stress on the importance of at once instituting an agricultural survey of each county in the kingdom. The object of this survey was to ascertain the means which would be most likely to promote a general system of agricultural improvement or the advantage of particular districts, and it was hoped that the information to be collected would indicate the measures which might be taken by the Legislature to promote agricultural development, and would induce land-owners and farmers to profit from the experience of others as to the best methods of managing their properties and cultivating their farms.

Sir John Sinclair proposed to follow the same procedure he had adopted in connection with his Statistical Account of Scotland and to collect information from the parish clergy. But a question on the subject of tithes, intended to lead up to proposals for commutation, aroused the suspicions of the Archbishop of Canterbury, who threatened Mr. Pitt with the withdrawal of the support of the

Church, and other means had therefore to be adopted.

A number of surveyors were then selected by the President to prepare county reports, which before final publication were to be circulated in draft to the most intelligent farmers for correction and addition. But unfortunately many of the surveyors were incompetent, and Arthur Young complained that some of them "scarcely knew the right end of a plough." The result was the production of an immense mass of ill-digested material of the most varying degrees of merit, all of which was printed at great expense on quarto paper with wide margins for corrections and additions. The issue of these publications, many of which were unreliable and incomplete, brought discredit on the Board, which was accentuated by the belief that the inquiries might lead to increased taxation. Moreover, the cost proved to be far in excess of the modest financial resources of the Board derived from the annual Parliamentary grant of £3,000, and, in consequence, Sir John Sinclair was deposed from the Presidency in 1798, and it was not till after his re-election in 1806 that the County Reports were completed and issued in final form as octavo volumes. In that form they comprise an interesting and valuable account of the state of agriculture throughout the country.

The Board also issued several volumes of "Communications" consisting of articles on agricultural subjects. One volume was entirely devoted to a series of essays on the conversion of grass to arable land, a subject which still exercises the attention of

agricultural reformers. These essays were written in competition for a number of premiums ranging from £200 to £5 5s. which were offered by the Board as a result of a request from a Select Committee of the House of Lords that the Board would "examine into and report upon the best means of converting certain portions of grasslands into tillage, without exhausting the soil and of returning the same to grass after a certain period in an improved state or at least without injury."

The request was occasioned by the scarcity of food due to the war with France, and having in mind the similar problem which arose in the Great War of 1914-1918, it is interesting to note that the general report made by the Board in 1801 stated that no high price of corn or temporary distress would justify the ploughing up of old meadows on the marshes or rich pastures which fatten cattle—an opinion which would be enthusiastically endorsed by most agriculturists of the present day.

Other directions in which the Board was active were in advocating and cheapening the process of inclosure of waste lands, which then amounted to no less than 22,000,000 acres in Great Britain; in organising lectures on agricultural chemistry by Sir Humphry Davy, who was appointed Professor of Chemical Agriculture to the Board at a salary of £100 a year; by establishing an experimental farm on six acres of land at Brompton, which Arthur Young characterised as "stark staring folly"; and by promoting an exhibition of live stock held at Aldridge's Repository, St. Martin's Lane, which was the first national Agricultural Show and the

forerunner of the Annual Shows of the Royal Agricultural Society.

The work of the Board covered therefore a wide field and much of it was of permanent value. But after Sir John Sinclair's final retirement from the Presidency in 1813 and the failure of Arthur Young's eyesight, it began to decline. Young became totally blind and had to retire in 1820, and in the previous year the Board, finding they had a credit balance of over £2,000, decided to apply for only £1,000 from the Treasury instead of the usual grant of £3,000.

This was a fatal step—the Treasury naturally saw their opportunity, and replied that they "did not feel themselves justified in recommending to Parliament to make any further grant for the service of the Board of Agriculture." Representations as to the feeling that might be excited by the discontinuance of the Board's premiums proved fruitless, and the Board was thrown entirely upon its own resources.

Efforts were made to continue on the basis of voluntary contributions, and the subscriptions of Ordinary and Honorary Members were fixed at £2 2s. a year. But in 1822 it was found that the subscriptions were inadequate to maintain the Board, and it was decided to return them and to dissolve. The final meeting of the Board was held on June 25th, 1822, the balance of the Board's funds amounting to £519 14s. 2d. was sent to the Chancellor of the Exchequer, and the records and documents to the Record Office in the Tower. The Royal Charter and the Seal of the Board are now in the possession of the Royal Agricultural Society of England.

The demise of the Board in 1822 was followed in 1838 by the foundation of the Royal Agricultural Society and its incorporation by Royal Charter in 1840, with Queen Victoria as its Royal Patron. The Society carried on much of the work of the old Board, particularly the organisation of Annual Agricultural Shows of a national character. But two other projects which had been advocated without success by the Board, viz. the compulsory commutation of tithes and the passing of a general Inclosure Act, were adopted by Parliament at about the same time and laid the foundation of the present Ministry of Agriculture. The Tithe Act of 1836 provided for the appointment of the Tithe Commission, which was entrusted with the duty of commuting the whole of the Tithes in England and Wales for money payments varying with the septennial averages of the prices of wheat, barley and oats, in place of payments in kind of one-tenth of the produce of the land. The Inclosure Act of 1845 established a body of Inclosure Commissioners and gave them power to frame Provisional Orders for inclosure, thus obviating the delay and expense involved in obtaining a special local Act of Parliament in each case.

In 1841 the Copyhold Commission was established to carry out voluntary enfranchisements of copyhold land, and by the Settled Land Act, 1882, the three bodies of Commissioners were merged under the title of the Land Commissioners for England. The Land Commission continued as a separate Department, under the jurisdiction of the Home Secretary, until the establishment of the Board of Agriculture in 1889.

The other principal foundation stone of the Ministry of Agriculture in its present form was the Cattle Plague Department which was established in August, 1865, to deal with the serious epidemic of cattle plague or rinderpest, which began at Islington in June, 1865, and by the end of the year had spread throughout the whole of Great Britain, over 70,000 cattle being attacked on nearly 10,000 separate farms. In the first instance the Department was a branch of the Home Office, but it was transferred to the Privy Council in 1866 and its title was changed to the Veterinary Department in 1870. After being armed with the power of slaughtering affected cattle by the Cattle Diseases Prevention Act, 1866, which was introduced on February 12th and received the Royal Assent on February 20th, the Department succeeded in stamping out the disease by September, 1867, and it continued in existence to administer a long series of Contagious Diseases (Animals) Acts, and to deal with other scheduled diseases, particularly pleuro-pneumonia.

The movement for the appointment of a special Minister responsible for all the functions of the Government relating to Agriculture began in 1879, but in the first instance it was proposed to combine Commerce with Agriculture for this purpose.

On July 8th, 1879, a resolution was moved in the House of Commons by Mr. Sampson Lloyd, the President of the Association of Chambers of Commerce, that it was "desirable that those functions of the Executive Government which especially relate to Commerce and Agriculture should be administered by a distinct Department under the direction of a

Principal Secretary of State, who shall be a member of the Cabinet." The resolution, especially the concluding words of it, was strongly opposed by the then Conservative Government, and no fewer than four Cabinet Ministers spoke against it, but it was carried on a division by 76 votes to 56. No action was taken in view of the change of Government which took place in the following year, but in 1881 Sir Massey Lopes moved another resolution in the House of Commons in the following terms:—

"That it is desirable that the functions of the Government which especially relate to Agriculture and Commerce should as far as possible be administered by a distinct Department and be presided over by a responsible Minister of the Crown."

In moving his resolution, Sir Massey Lopes called attention to the inconvenience of the existing arrangement under which Cattle Diseases were under the President of the Council; Agricultural Statistics under the Board of Trade; Woods and Forests under a separate body of Commissioners; while a Government Bill on Agricultural Holdings had been placed in charge of the First Lord of the Admiralty. It was also stated that a request sent to the Privy Council for a supply of the orders relating to Cattle Plague had been met by the dispatch of a parcel of forms of thanksgiving drawn up by the Archbishop of Canterbury for a bounteous harvest. Sir Massey Lopes proposed that in addition to the concentration in one Department of all agricultural functions, the Department should also take over from the Local Government Board the care of roads, highways and bridges. The resolution was accepted in principle

by Mr. Gladstone and was carried without a division. Action was taken in 1883, when an Order in Council was made establishing a Committee of the Privy Council for the consideration of all matters relating to agriculture. The Lord President of the Council was appointed Chairman of the Committee, and in his absence the Chancellor of the Duchy of Lancaster. The Veterinary Department of the Privy Council Office thenceforth became the Agricultural Department, and it took over from the Board of Trade the duty of issuing the Annual Agricultural Statistics, though the actual collection remained in the hands of the Inland Revenue Department. The main function of the Agricultural Department, however, continued to be the administration of the Contagious Diseases (Animals) Acts, and the Land Commission remained as a separate body.

These arrangements did not satisfy the representatives of Agriculture in Parliament, and in 1887 the Government admitted the need of re-constitution. A Bill for the establishment of a Board of Agriculture was introduced in 1888 but was not proceeded with. In the following year it was again introduced and passed into law as the Board of Agriculture Act, 1889.

In moving the Second Reading of the Bill, Mr. W. H. Smith, while deprecating any extravagant hopes that the Board would find a solution of the depression which had fallen on the industry, said, "We have to endeavour by all the means in our power to bring back prosperity . . . not by any action of Parliament, not by the fostering care of

a Department, but by bringing home to them that knowledge and power by which they themselves may work out their own deliverance." The same modest note was struck in the financial provision made for the new Board. Those were thrifty days. The first Estimate for the expenses of the Board amounted to a net sum of £55,000, which was only £7,000 more than the cost in the previous year of the Land Commission and the Agricultural Department of the Privy Council, and the only sum at the disposal of the Board for supplying to agriculturists the knowledge and power to which Mr. W. H. Smith referred was a modest grant of £5,000 for agricultural and dairy schools. The staff of the new Board consisted of ninety persons, which was one less than the combined staffs of the Land Commission and the Agricultural Department of the Privy Council.

The Act constituted the Board on similar lines to the Board of Trade and the Local Government Board. It was to consist of the Lord President of the Council, the principal Secretaries of State, the First Lord of the Treasury, the Chancellor of the Exchequer, the Chancellor of the Duchy of Lancaster, the Secretary for Scotland and such other persons (if any) as might from time to time be appointed by the Crown. It was further provided that any member of the Privy Council might be appointed to act as President of the Board, and that the Board should not be entitled to act unless the President or one of the officers of State above-mentioned was present. In point of fact the Board as such never met. During the discussion

on the Bill objection was raised to the creation of a phantom Board, and the appointment of a Minister of Agriculture without a Board was advocated. This was opposed by the Government on the ground that the term "Minister" would be an undesirable innovation in official phraseology, and that there were advantages in having a Board, other members of which could act for the President in an emergency.

The Act provided for the transfer to the Board of the following powers and duties:—

(a) The powers and duties of the Privy Council under the Contagious Diseases (Animals) Acts and the Destructive Insects Act, 1877.

(b) The powers and duties of the Land Commission under the Acts relating to tithes, copyholds, inclosure, commons, allotments, land drainage, improvement of lands, universities and college estates, glebe lands and agricultural holdings.

(c) The powers and duties of the Commissioners of Works and Buildings in connection with the Ordnance Survey.

The Act also provided for the transfer to the Board by Order in Council of any other powers and duties of a Government Department relating to agriculture or forestry, and of an administrative character. Under this provision the responsibility for the Royal Botanic Gardens, Kew, was transferred to the Board in 1903 from the Commissioners of Works and Public Buildings.

The Board was also empowered by the Act to make orders for the muzzling and control of dogs; to collect statistics relating to agriculture and forestry and to inspect and aid schools, other than

elementary schools, in which instruction is given in agriculture and forestry.

The salary of the President was fixed by the Act at £2,000 a year, and the Board was formally constituted on September 9th, 1889, by the appointment as the first President of Mr. Henry Chaplin (afterwards Viscount Chaplin), than whom no more typical representative of British agriculture could have been selected. Sir James Caird, who had been the Chief Land Commissioner, was made a Privy Councillor and appointed a member of the Board.

The Board of Agriculture and Fisheries Act, 1903, altered the name of the Board to the Board of Agriculture and Fisheries and transferred to it the powers and duties of the Board of Trade relating to salmon, freshwater and sea fisheries. The appointment of a Parliamentary Secretary to the Board was authorised by the Board of Agriculture and Fisheries Act, 1909.

The Board was in the first instance responsible for agricultural matters throughout the whole of Great Britain, but by the Small Landholders (Scotland) Act, 1911, a separate Board of Agriculture for Scotland was established which took over all the Scottish duties of the Board of Agriculture and Fisheries, with the exception of those relating to the Diseases of Animals and the Ordnance Survey.

By the Forestry Act, 1919, the powers and duties of the Board of Agriculture and Fisheries in relation to forestry were transferred to the Forestry Commission, which was established by the Act to promote

forestry throughout the whole of the United Kingdom.

Finally in the same year the Board of Agriculture and Fisheries was reconstituted as the Ministry of Agriculture and Fisheries by the Ministry of Agriculture and Fisheries Act, 1919. The Board was abolished and a Minister of Agriculture and Fisheries was substituted for it, and was made a corporation sole for the purpose of acquiring and holding land or other property.

It is of interest to note that this change was not proposed by the Government or by the Board itself, but was the result of amendments moved by private Members in the House of Commons during the progress of the Bill, which in the first instance was merely intended to establish Agricultural Councils for England and Wales and County Agricultural Committees. During the Great War such County Committees had been formed to stimulate food production, and it was considered desirable to continue them in a statutory form and to establish a complete organisation beginning with a Committee in each county to administer all the powers and duties of the County Councils relating to agriculture, and leading up to Councils of Agriculture for England and for Wales and an Agricultural Advisory Committee for England and Wales.

The Act provided that each County Council in England and Wales (other than the London County Council) should appoint an Agricultural Committee to which should stand referred all the agricultural duties of the Councils. The London County

Council and the Councils of county boroughs were empowered to appoint Agricultural Committees but are not compelled to do so. The Committees are to consist, as to two-thirds of their number, of persons appointed by the County Councils, and members of the Council must comprise a majority of the whole Committee. The Minister of Agriculture is empowered to appoint not more than one-third of the Committee, and the Act requires that membership of the Committee should be confined to persons who have practical, commercial, technical or scientific knowledge of agriculture or an interest in agricultural land. The Committee must also include women among its members.

The Act therefore embodies an interesting new departure from the ordinary principles of local government in this country by providing not only for the co-optation by the Council of persons who are not members of the Council and for the addition of persons appointed by the Minister, but also by requiring an agricultural qualification in all the members of the Committee, including those who have been elected by the ratepayers as members of the Council. In addition the Council is empowered by the Act to defray the travelling expenses and subsistence of members of the Committee, which also is contrary to the normal practice in the case of Local Government Authorities.

The Council of Agriculture for England, which is established by the Act, is composed of two members appointed by each County Agricultural Committee, together with thirty-six other members appointed by the Minister, eight of whom must be

representative of agricultural workers, four of agricultural landowners, four of agricultural tenants, not less than three women, not less than six representatives of horticulture and not less than three representatives of agricultural education and research.

In the case of the Welsh Council, there are in addition to the two representatives from each County Committee five representatives of the University of Wales and twelve persons appointed by the Minister, of whom not less than five must be representative of agricultural workers, not less than two must be agricultural landowners, not less than two agricultural tenants and not less than two women.

The Councils have no executive powers, but they are required to meet in public at least twice in each year to discuss matters of public interest relating to agriculture or other rural industries. They settle their own procedure and agenda and are independent of the Minister and subject to no control by the Government, but it is customary for the Minister to attend the meetings as an invited guest.

The Act also provides for the establishment of an Agricultural Advisory Committee for England and Wales to advise the Minister on any matters referred to it, and it is empowered to make any recommendations it thinks fit to the Minister in regard to any matters affecting agriculture or other rural industries.

The Minister and the Parliamentary Secretary are entitled to attend the meetings of the Advisory Committee and to act as Chairman but they may

not vote. The other members of the Committee are appointed as follows :—

(a) Five are elected by the representatives of the County Agricultural Committees on the Council of Agriculture for England.

(b) Five are elected by the members appointed by the Minister on the Council of Agriculture for England. Of these five, one must be an agricultural landowner, one an agricultural tenant, one a woman, one a representative of agricultural workers and one a representative of agricultural education or research.

(c) Two are appointed by the Minister to represent employers and workers respectively.

(d) Two are appointed by the Council of Agriculture for Wales.

(e) Two are appointed by the Secretary for Scotland, but they are only entitled to attend and vote in regard to matters arising under the Diseases of Animals Acts.

The effect of the Act is therefore to set up a complete scheme of organisation, by which it was hoped that the agricultural opinion of the country would be focused in representative bodies which would be in a position to discuss agricultural questions and give their considered advice to the Minister.

ORGANISATION AND GENERAL SERVICES

THE Ministry is organised in seven Divisions, in which are grouped the various branches of its work, and two other Divisions which carry out the general services of the Department in relation to establishment and finance. Six of the seven Divisions are under the charge of Assistant Secretaries, and the other, which is concerned with animal diseases, is under the charge of the Chief Veterinary Officer, who is a professional Veterinary Surgeon. The Establishment Division is under the charge of a Principal Establishment Officer, and the Finance Division under a Principal Finance Officer. Each head of a Division has under him one or more branches under the charge, either of a Principal belonging to the administrative class of the Civil Service, or of a Senior Staff Officer. The heads of branches are assisted by Assistant Principals, Staff Officers and Higher Grade Clerical Officers, who take charge of sections of the work. Several Divisions also have attached to them technical officers, some of whom are graded as Commissioners, and those Divisions whose work requires the maintenance of an outdoor staff have a Chief Inspector who is responsible for the work and discipline of the inspectorate.

Each head of a Division is responsible for all the

work carried on in his Division, but in matters which raise questions of political or public importance he would refer the case to the Permanent Secretary for submission if necessary to the Minister. The volume and complexity of the work of the Ministry has grown so great that it is impossible for any Permanent Secretary to control the work in detail, and each Assistant Secretary has direct access to the Minister if he so desires. Any matters involving questions of staff or finance have to be referred to the Establishment or Finance Division for examination before any action is taken.

As far as possible personal consultation between the principal members of the staff has taken the place of writing long minutes to one another, and in order to keep the Minister and the Parliamentary Secretary informed of the current work of the Ministry, without troubling them to read a large number of official files, a monthly report is prepared, which is discussed by the Minister with the principal officers of the Department at a staff conference.

The Economics Division of the Ministry includes three Branches dealing respectively with Statistics, Labour and Marketing. The Statistical Branch is responsible for the collection and tabulation of the annual Agricultural Returns and the returns of Market Prices, and for the publication of the weekly Agricultural Market Report. It maintains a large staff of part-time Crop Reporters and Market Reporters all over the country. The Labour Branch deals with the administration and enforcement of the Agricultural Wages (Regulation) Act and any other labour questions. It employs a staff of Inspectors

for the local investigation of complaints, etc. The Markets Branch deals with the marketing of agricultural produce, with agricultural credit and co-operation, and it also is responsible for the administration of the British Sugar (Subsidy) Act. A small staff of Market Investigators is attached to this Branch.

The Diseases of Animals Division is responsible for all measures for the control, treatment and eradication of animal diseases, and it deals with questions relating to the importation of animals from abroad, the exportation of horses, and the administration of the Orders made to prevent suffering to animals during transit. The Division includes a large staff of Veterinary Inspectors stationed throughout the country, and associated with it is the Ministry's Veterinary Laboratory at Addlestone, where research is carried out on the scheduled diseases of animals and on the diseases of poultry. This is the only Division of the Ministry whose work extends to Scotland as well as to England and Wales.

The Education and Research Division comprises three branches. The Education Branch is responsible for the administration of the grants for agricultural education to the University Departments of Agriculture, the Agricultural Colleges and the County Councils, and for the scheme of scholarships for the sons and daughters of agricultural workers. It includes sections which deal with all matters relating to the special schemes for dairy and poultry education, including the organisation of clean milk competitions, co-operative cheese schools, egg-laying trials and the egg and chick

distribution scheme. The Research Branch administers the grants to the Agricultural Research Institutes, and deals with the work of the advisory officers attached to the Agricultural Colleges and University Departments, and with the award of scholarships and fellowships to research workers. The Horticulture Branch administers the Acts and Orders relating to plant diseases and pests, including the control of importation and the issue of health certificates for exports. It is also responsible for all schemes for the development of commercial horticulture, including bee-keeping. The technical advice required by the Branch in connection with plant diseases is supplied by the staff of the Ministry's Plant Pathological Laboratory at Harpenden.

The Division maintains a joint inspectorate for the local work of all three branches.

The Live Stock Division is responsible for the administration of the grants for premium sires and milk recording societies, and deals with the licensing of stallions and the export of pedigree stock. It is also responsible for the National Stud in Ireland. The Division includes a staff of Live Stock Officers stationed throughout the country, who also carry out any local inquiries required by the Statistical Branch.

The Land Division administers the Small Holdings and Allotments Acts, the Ministry's Farm Settlements, and the Lands Improvement and Settled Land Acts. It has a staff of Commissioners and Assistant Commissioners who act as the local agents of the Division in relation to the provision of small holdings by the County Councils. The Division

also includes a branch dealing with a wide range of questions arising under the Glebe Lands Act, the Universities and College Estates Acts, the Commons Acts, the Agricultural Holdings Acts, the Law of Property Acts and the Rats and Mice (Destruction) Act, as well as with the constitution of the County Agricultural Committees.

The Commercial and Tithe Division includes four branches. The Tithe and Survey Branch, which has the largest staff of any branch of the Ministry, deals with the redemption, apportionment and merger of tithe rent charge, and with the examination and preparation of maps for all purposes required by the Ministry. The Commercial and Seeds Branch is responsible for the administration of the Seeds Act, the Fertilisers and Feeding Stuffs Acts, and the Merchandise Marks Acts and the Sale of Food and Drugs Acts, so far as they affect agricultural produce. The Land Drainage Branch deals with all questions relating to arterial drainage, including the constitution of Drainage Boards and the administration of grants in aid of Drainage schemes. The Publications Branch undertakes the preparation and issue of the Ministry's Journal, leaflets and other publications, and is responsible for the care of the Ministry's Library. There is also a small publicity section for the issue of information to the Press, which is also responsible for wireless bulletins and films. This Division also deals with all questions connected with the development of rural industries.

The Fisheries Division is responsible for all the fishery work of the Ministry, including the adminis-

tration of the Sea Fisheries Acts and the Salmon and Freshwater Fisheries Act, the collection of fishery statistics, and for scientific research into fishery problems, which is carried out at the Fisheries Laboratory at Lowestoft by a staff of research workers and a research vessel. The Division has an outdoor staff of fishery officers and of collectors of fishery statistics, stationed at the principal ports round the coast.

In addition to these Divisions at headquarters the Ministry has a Welsh Office at Aberystwyth, under the charge of the Welsh Secretary of the Ministry, which carries on the work of agricultural education, live stock improvement and the provision of small holdings and allotments in Wales.

Further particulars of the work of the above-mentioned Divisions of the Ministry are given in subsequent chapters of this book. It remains to give some account of the work and functions of the Establishment and Finance Divisions, which carry out general services for the Ministry as a whole, and form an integral part of the organisation of the office.

Establishment

The Establishment Division is concerned with all matters of office and staff organisation. It deals with the provision of stationery, office equipment and accommodation, printing, typewriters and telephones ; it includes the staff of the Registry and the typing staff ; and it controls the messengers and charwomen. A strong and tactful Establishment Branch is of the first importance in securing

efficient and economical administration of a Department, in developing good team work and in promoting a spirit of goodwill and confidence throughout the staff. It is the duty of the Establishment officers to keep in touch with the work of the whole office, to see that the various branches are adequately but not excessively staffed, to consider possibilities of economy by the use of labour-saving appliances or by the simplification of procedure, and to deal with cases in which disciplinary action is necessary. All their work has to be carried on in the closest co-operation with the heads of the various Divisions and Branches, so that there may be a united effort throughout the Department to secure the utmost efficiency and economy. The Establishment Branch is responsible for keeping and checking records of the ordinary and sick leave of the staff, and for seeing that the official hours of attendance are duly observed, and that late attendances or absence without leave are noted and dealt with. All applications for increases of staff or salaries are referred to and examined by the Establishment Branch, and it undertakes all the correspondence with the Treasury on staff questions. It deals with all cases of promotions, and it is responsible for the submission of the staff for superannuation. The normal practice of the Ministry is that its officers retire on reaching the age of 60, but in exceptional cases they may be retained in the public interest up to a later age not exceeding 65 years. The supply of stationery, furniture, etc., required for the work of the Ministry either at headquarters or in the provincial offices is centralised in the

Establishment Branch, which requisitions what is needed from the Stationery Office or the Office of Works, and is responsible for the custody and control of a sufficient stock for current requirements. Standardisation in these matters has been carried to a fine art, but delicate questions still sometimes arise as to whether a particular officer is of the status entitling him to a carpet in his room or an electric lamp on his table, and these have to be solved by the Establishment Branch. The Ministry, being a comparatively new Department, does not possess as much old furniture as some of the more ancient Departments, but it has some fine cupboards and bookcases inherited from the Tithe Commission, and a few pairs of brass candlesticks dating from the time of William IV. Quite recently it handed over on loan to the Office of Works a pair of exceptionally handsome mahogany pedestals and urns, which must originally have been used as wine coolers. In these prosaic days such articles are not required in a Government office, and it was considered that they could be displayed to greater advantage in an Embassy or Government residence.

Registry

An important part of the Establishment Division is the Registry, which is responsible for the receipt, registration, indexing and distribution of the whole of the Ministry's correspondence. It is not usually realised what an immense mass of correspondence passes through a Government Department in these days. It is said that one of the business men who was appointed a Controller of a Government office

during the war expressed the wish on his arrival to see all the letters which reached the office on the following day. He was somewhat staggered, when next morning six messengers entered his room and deposited on the floor six large sacks containing the morning's post. Nothing daunted, however, he started on the first sack and rapidly opened and perused some of the letters. Finding that they dealt with matters of apparently trivial importance, he proceeded to tear them up and throw them into the waste paper basket, till he was stopped by his scandalised secretary, who pointed out that any letter from a member of the public to a Government Department might contain the germ of an acute political crisis, which, if neglected, might seriously embarrass or even overthrow the Government.

The secretary was no doubt an old-fashioned Civil Servant, but there was some ground for his horror. Though everything that comes into a Government Department is not in these days formally registered and preserved for ever, a considerable part of the correspondence must be carefully recorded and indexed, so that it can be referred to when necessary. An apparently unimportant inquiry, which is neglected or lost, may be the prelude to a series of indignant questions in Parliament, which may do serious damage to the political reputation of the Minister and the business reputation of the Department.

The number of separate communications which arrive at the head office of the Ministry in a year is over one and a quarter million, and something like

two million letters and other communications are dispatched annually. The number of new registered files made up each year is over 400,000. Communications from the same correspondent on the same subject are placed on the same file, and all papers are indexed both under the name of the correspondent and under the subject matter of the correspondence. After registration the papers are sent to the appropriate Branch of the Ministry to be dealt with, and a record is kept of their whereabouts. After any necessary action has been taken the papers are returned to the Registry for custody. The system is remarkably efficient, and a request for a file of papers on any subject, even if it is some years old, is almost invariably responded to within fifteen minutes. In addition to ordinary correspondence the Registry has to deal with the receipt each day of considerable sums of money in small amounts representing payments for tithe redemption, for fees of various kinds, for the Ministry's publications and for other matters. The amount of cash received averages £1,000 a day and elaborate precautions are taken in consultation with the Finance Branch to ensure its safe receipt and proper allocation.

The preservation or destruction of papers after the necessary action has been taken on them is regulated by the Public Record Office Act, 1877, and Orders in Council made thereunder. Schedules are prepared from time to time in consultation with the Record Office setting out different classes of papers and the period after which they may be destroyed. The Schedules have to be approved

by the Master of the Rolls and are submitted to Parliament. Unimportant returns and correspondence may be destroyed after two years, and longer periods up to fifty years are prescribed for papers of more importance which may be required for reference. Classes of papers which may be of permanent importance are not included in the Schedules, and they may not be destroyed, but the question is reviewed every five years to see if their further preservation is desirable, or if they should be included in a new Schedule. Documents such as tithe apportionments, manorial records, etc., are of course preserved for ever, and as they may be often required for reference, they are kept at the Ministry instead of being deposited at the Public Record Office.

A considerable number of the correspondents of the Ministry are simple and unlearned people, whose letters afford some humorous relief to the official routine. The collection of the Annual Agricultural Returns from some 400,000 farmers and smallholders in England and Wales invariably produces some gems. It is no easy matter to frame the questions in the form of return in such a way that they will be clear to the simplest intelligence. For instance, the question as to the live stock kept is accompanied by the instruction, "If not pure bred, state type or general character." The answers not infrequently are "type" or "general character" or "type or general character." In one case the answer was, "The cattle are cross bred. Some take after the bull, some after the cow, and the bull sometimes takes after the cowman." In another case the reply was,

“The lady clerk has gone for her holidays with the cowman or you should have had more details.” In reply to a question as to the quantity of milk produced, the laconic reply was received, “Calf suck cow.” Inquiries as to the motive power used on farms produced replies of “a wheelbarrow,” “a cart” and “swearing.” Some of the replies display a sturdy contempt for Government inquisition, like the answer as to eggs produced, “You silly cuckoos, do you think we have nothing else to do but watch hens lay eggs and book each one ?” or the farmer who replied, “These questions are getting too personal and too much Lloyd George”; or the other who added, “You forgot to ask me how many times I went to church on Sundays.” But it is not only the simple and unlearned agriculturist who lets himself go on the Agricultural Returns. There was the case of a well-known Cabinet Minister who included among his live stock “one pullet murdered by a motorist,” expressed his complete inability to say how many brussels sprouts or radishes he grew, and wound up by an offer to sell a number of primula plants to the Minister at a proper price.

Spelling is also a great snare to many of the Ministry’s correspondents. No fewer than twenty-nine different spellings of the word “acre” have been recorded, and a return of the labour employed on one farm included “6 meals and 2 feameales.”

Finance

A very important part of the office machinery is the Finance Division, which is under the direct

control of the Permanent Secretary, who is also the Accounting Officer of the Ministry, and as such is personally responsible for all the Ministry's expenditure. It is the duty of the Finance Division not only to undertake the Ministry's book-keeping and accounting, but also to consider proposals for additional expenditure as well as current expenditure from the point of view of economy in policy and management. Arrangements are therefore in force under which any schemes involving expenditure are referred to the Finance Division for examination and criticism at an early stage, before any commitment is incurred. In addition, all letters to the Treasury containing proposals involving expenditure pass through the Finance Division, before being submitted to the Permanent Secretary for approval and signature. It is the business of the staff of the Finance Division therefore to keep in touch with all the work of the Ministry, and to cultivate close relations with the administrative officers of the other Divisions and Branches.

The Finance Division is responsible for the important work of preparing each year the Estimates of the Ministry for submission to the Treasury and subsequent presentation to Parliament. The Estimates comprise two separate Votes, one for the normal services of the Ministry, and the other for the temporary subsidy for beet sugar. The Ministry's general estimate amounts to a gross amount of over £2,000,000 a year, divided between nearly fifty separate sub-heads, and the Beet Sugar Estimate amounted in 1927 to £4,500,000, but will be reduced substantially in future years as

the subsidy diminishes. The gross total of the Ministry's Vote is reduced by Appropriations in Aid amounting to nearly £500,000 a year, mainly in respect of grants from the Development Fund for Agricultural Research. The cost of the beet sugar subsidy is offset by the receipts from the Excise duty on home-grown sugar, which amounted in 1927 to £1,500,000, but these receipts do not pass through the Ministry's accounts, but are accounted for by the Board of Customs and Excise.

The Ministry's Vote is particularly complicated, not only on account of the great variety of the services which it covers, but also because it includes within it two separate statutory accounts, viz. the Cattle Pleuro-Pneumonia Account for Great Britain, out of which is paid the compensation for foot and mouth disease; and the Small Holdings Account, which finances the losses on the small holdings provided both by the Ministry and also by the County Councils. The Vote is also complicated by the fact that several services are financed, either in whole or in part, by grants from the Development Fund, and some services are financed partly from voted monies and partly from Development Fund grants. The preparation of the Ministry's Estimates involves a great amount of detailed work by the staff of the Finance Division in the later months of each year, and estimates have to be made in October of the probable expenditure under each sub-head of the Vote for the financial year beginning in the following April. In the case of new services, Treasury sanction to any expenditure involved has to be obtained before any sum can be

included in the Estimates, and no expenditure on new schemes can actually be incurred until the Estimate has been passed by Parliament, which may not be till the following August. Great care has to be exercised to see that the amount required for each sub-head is neither over-estimated nor under-estimated. An over-estimate involves a call on the taxpayer for more than is necessary, and a surrender to the Exchequer of the unexpended balance at the end of the year. An under-estimate involves the presentation of a Supplementary Estimate, which is the special bugbear of all Ministers and all good Civil Servants. During the war and for a few years after, accurate estimating was impossible, but in normal times the margin between estimates and expenditure is very close, in spite of the fact that in the case of a Department like the Ministry, the actual expenditure is dependent on the initiative of Local Authorities and other bodies whose action cannot be accurately foreseen many months or a year ahead, and which are not under the control of the Government. When the Estimates have been prepared and submitted to Parliament, the Finance Division is responsible for preparing, in co-operation with the heads of the other Divisions, a series of memoranda for the use of the Minister when the Vote is discussed in the House of Commons. These memoranda contain full information as to the progress of the work for which the Ministry is responsible, and they endeavour to anticipate all probable criticisms and inquiries.

After the close of each financial year the Finance Division is responsible for the preparation of the

Annual Appropriation Account, which sets out the actual expenditure under each sub-head compared with the amount voted, and states the reasons for any variations between expenditure and grant. The Appropriation Account is sent to the Comptroller and Auditor-General, who makes a report upon any matters which in his opinion require comment or investigation. His report is considered by the Public Accounts Committee of the House of Commons, and the Accounting Officer of the Ministry has to appear before the Committee to be examined on the report and accounts. This examination may be a severe ordeal for an Accounting Officer who is responsible for a large and varied expenditure, especially as the examination takes place about two years after the expenditure has been incurred. In the meantime the political atmosphere may have completely changed, and expenditure which was in full accordance with the policy of Parliament at the time may have come to be regarded as excessively wasteful and unwise.

The Finance Division is also responsible for the preparation each year of trading accounts and balance sheets of the commercial services conducted by the Ministry. These include accounts for each of the Ministry's farm settlements for ex-Service men and for the National Stud. After the war, when the Ministry was responsible for a great variety of semi-commercial services ranging from a factory for the production of rat poisons to schemes for the purification of mussels and the manufacture of poultry grit from the slipper limpet, no fewer than fifty separate trading accounts had

to be presented, a number which was almost equal to the total number of trading enterprises undertaken by all the other Government Departments together. But most of the war schemes have now been closed down and the trading accounts of the Ministry have been reduced to less than twenty. The accounts are designed to show for the information of Parliament and the public the commercial results of Government trading, and, under Treasury instruction, they are so constructed as to emphasise the least favourable aspects of such work. In the case of such enterprises as the Ministry's farm settlements, which were never intended or expected to make profits for the Government, the trading accounts almost inevitably tend to give an impression of unbusinesslike methods which is seized upon by the Press critics of bureaucracy. It is often necessary therefore for the Accounting Officer, when he is examined on the accounts by the Public Accounts Committee, to point out that so-called Government trading is frequently undertaken on grounds of social policy or to carry out political pledges, and that the expenditure should be regarded not only from the point of view of the balance sheet, but also as a part of the social or economic programme of the Government.

The Finance Division is responsible for the payment of the various grants given by the Ministry for agricultural education and research and other purposes; for the examination and payment of the claims made by County Councils in connection with losses incurred in the provision of small holdings; for keeping the necessary books of account for all

the Ministry's financial transactions; and for the payment of the salaries and wages of the Ministry's staff. Special attention is given to the expenditure on travelling expenses, and the Finance Division is expected to scrutinise closely the accounts of travelling officers and to satisfy themselves that the expenditure was properly and necessarily incurred, and that the journeys undertaken were planned with due regard to economy of time and cost.

The Finance Division is also responsible for a considerable amount of investment business. Under the Universities and College Estates Acts the Ministry holds as trustee for the Universities of Oxford, Cambridge and Durham, for the constituent Colleges and for the Public Schools of Eton and Winchester, securities amounting in value to nearly £6,000,000. Before the war the nominal value of the securities held by the Ministry was under £1,500,000, but after the war, when the value of land was high, much of the land belonging to the universities and colleges was sold and the proceeds invested in trustee securities. In recent years, when land has fallen in price, there has been a tendency to re-invest in land. The funds held by the Ministry are invested in nearly two hundred different securities, mostly British Government, Indian or Colonial stocks, and new investments or alterations of existing investments are made by the Finance Division in consultation with the college bursars and through the Government brokers and the Bank of England. In recent years the procedure has been greatly speeded up so that no delay takes place

in taking advantage of favourable opportunities of profitable investment.

Legal Branch

An important part of the general services of the Ministry is the Legal Branch, which provides advice on the legal questions which frequently arise in many branches of the Ministry. The Legal Adviser is also closely concerned with any proposals for new legislation, and is the medium of communication with the Parliamentary draftsmen in connection with the preparation of Bills. His staff are responsible for the conduct of prosecutions which may have to be undertaken by the Ministry, such as those arising under the Agricultural Wages (Regulation) Act, and they settle the form of any orders or legal documents issued by the Ministry. The legal staff of the Ministry also undertake the legal work of the Commissioners of Crown Lands which has involved in recent years a very considerable amount of conveyancing work in connection with the grant of new leases on the Crown property in London, particularly in Regent Street.

Publications

The Ministry issues a large number of publications, and this work is undertaken for all the Divisions of the Ministry by the Publications Branch. It is responsible for the preparation and editing of the Ministry's monthly Journal, and for some four hundred leaflets on crops, stock, diseases and pests and other agricultural topics, which are constantly being revised. The leaflets are issued singly and

also in sectional volumes on distinct subjects, and they have a very large circulation. Many of the leaflets are used for teaching purposes in elementary and other schools. A charge is made where more than one leaflet is required, and the sectional volumes are sold at prices ranging from 6d. to 1s. 6d. The receipts from sales are sufficient to cover the cost of publication. A considerable number of miscellaneous publications are also issued, including a series of agricultural research monographs, which describe in as simple language as possible the work carried on at the Research Institutions and its bearing on practical agriculture.

The Publications Branch also includes the Ministry's Library, which contains a large collection of books, reports and pamphlets on agriculture at home and abroad. The Library is used not only by the staff of the Ministry, but also by many students and investigators from outside, and arrangements are made for the loan of books to those who cannot attend in person.

The branch is also responsible for the issue of information to the Press, and for the preparation of wireless bulletins. The Ministry makes considerable use of broadcasting and it has proved of great value in disseminating information to farmers and smallholders all over the country. Once a fortnight an agricultural bulletin, including information as to market prices, is broadcast from the London station, and once a month a special talk is given by some well-known agricultural expert.

The Private Secretaries

A considerable number of questions are addressed to the Minister of Agriculture in the House of Commons. On the average five or six questions to the Minister appear on the Order Paper every day during the Session, and arrangements have to be made to collect the information necessary for the Minister's reply. It is work which has to be regarded as particularly urgent, since very short notice is given, and not infrequently a Question appears on the paper in the morning which has to be answered the same afternoon. This work is done by the Minister's Private Secretaries, who refer the Question to the appropriate Division, and obtain a draft reply which is then sent through the Permanent Secretary to the Minister for his consideration and approval. In some cases information may have to be obtained from the country by telegraph or telephone, and joint consultation may be necessary with some other Department. It may also be necessary to supply the Minister with additional information in case his reply gives rise to Supplementary Questions. The wording of replies to Parliamentary Questions requires special care and a knowledge of the psychology of the House of Commons, in order to secure that the reply will convey clearly the information desired, will, if possible, give satisfaction, and will not cause embarrassment to the Minister or to the Government as a whole. The position of Private Secretary to a Minister is therefore an important one. It is usually filled by one of the most promising junior officers of the Department, though occasionally a

Minister may bring in a Private Secretary from outside. In practically all cases, however, a Minister will find it more useful to have a man who knows the work of the office and the sources of information, and a tactful and capable Private Secretary can save his Chief from much unnecessary worry, and also be a great asset to the Department as a whole. The duties of a Ministerial Private Secretary cover a wide field, including keeping the Minister's papers, dealing with his personal correspondence, arranging deputations and interviews and protecting him from bores and cranks. They may also include more personal services, and it is said that one Private Secretary expressed the view that while he was quite prepared to take theatre tickets for his Chief's wife and take his daughter to dances, he did draw the line at taking his boots to be mended or his razors to be ground.

Chapter III

STAFF

THE staff of the Ministry is large in number and varied in character, to correspond with the wide range of duties for which it is responsible. It comprises in addition to the administrative and clerical classes, which are common to the Civil Service as a whole, a large number of specialist officers of various kinds. Over one hundred Veterinary Surgeons have to be employed full time in the campaign against Animal Diseases, in addition to some 250 Veterinary Surgeons in private practice, who are employed part-time and are paid by fees according to the work done. Land agents, surveyors and architects are required for the work connected with the provision of small holdings ; engineers for land drainage, entomologists and mycologists for the campaign against plant diseases and pests ; chemists, biologists and zoologists for the various branches of agricultural and fishery research ; agricultural experts for the work of agricultural education ; sailors and others as fishery officers ; barristers and solicitors for the legal work of the Ministry ; an expert in rat destruction ; and men who are good judges of stock, as live stock officers. In addition a considerable number of tenant-right valuers, land agents and farmers are employed part time as Crop

and Market Reporters. Kew Gardens requires the services of systematic and economic botanists as well as highly skilled gardeners ; and the Ordnance Survey is manned by Royal Engineer officers and men as well as civilian technicians, draughtsmen and surveyors.

The total staff for which the Ministry is responsible (including Kew Gardens and the Ordnance Survey) is nearly 3,500. Of this number nearly 1,000 consist of part-time officers and of industrial workers at Kew, at the National Stud, and at the Ministry's Farm Settlements, etc. Of the remainder, the Ordnance Survey accounts for over 1,000, and the scientific staff at Kew for approximately 50, leaving the Ministry proper with a staff of approximately 1,400 full-time officers. Of these 950 are employed at the Ministry's offices in London, and the remainder are stationed in the Provinces.

The headquarters staff includes some 35 members of the administrative class of the Civil Service, some 30 staff officers, 50 higher grade clerks, and over 500 members of the clerical classes, including women writing assistants. In addition there are over 100 typists, 60 messengers and 50 charwomen.

The bulk of the headquarters staff is housed in the main office of the Ministry in Whitehall Place, a building which was erected for the purpose just before the War. It was however not occupied by the Department till 1920, as it was requisitioned for the period of the War as the headquarters of the Ministry of Munitions, when it was known as Armament Buildings. It is now used for more peaceful purposes and the character of the work

carried on within its walls is indicated by the cow's head carved in stone above the principal entrance. The Ministry also occupies an adjacent house in Whitehall Place, which was the original house of the Board of Agriculture, and before that was the headquarters of the Metropolitan Police, prior to the erection of New Scotland Yard. The Fisheries Division of the Ministry occupies an old and inconvenient house in Parliament Street, which however has the compensating advantage of possessing a balcony from which excellent views can be obtained of the Royal processions for the opening of Parliament, and of the Armistice Day services at the Cenotaph. The Ministry also occupies an office close to the Old Bailey in the City, where the staff of the Tithe Branch is housed. Though the separation of the staff in four separate buildings is neither convenient nor economical, the demand for and the value of office accommodation in the neighbourhood of Whitehall is so great, and the cost of new buildings so prohibitive, that it is inevitable at present. At any rate the position is much better than it was during the War, when the Ministry was housed in no less than 19 different buildings all over the south-west of London. It was estimated at that time that the concentration of the bulk of the staff in one building would reduce the number of messengers and cleaners required by 58 and the cost by £4,000 a year. As a matter of fact the actual reduction of numbers has been 68 and the reduction of cost £5,000 a year.

The provincial staff of the Ministry consists mainly of the Commissioners, Inspectors and Live-

Stock Officers who act as the local agents of the Department in connection with the provision of small holdings, the development of agricultural education, the operations against animal and plant diseases, and the promotion of the schemes of live stock improvement. In addition, the scientific staff of the Fisheries Division carry on their work at the Fisheries Laboratory at Lowestoft, in association with the Research vessel which is based on that port.

In recent years the inspectorate of the Ministry has been reorganised, so as to avoid as far as practicable having a number of small groups of inspectors each working independently of the others. The varied range of the work of the Ministry makes it impossible to have one general inspectorate for all the work, but as far as possible all the members of the provincial staff of a district are stationed in the same town and use the same office and clerical staff. The agricultural inspectorate is organised in four main divisions dealing with (1) animal diseases, (2) education, horticulture, poultry and dairy work, and plant diseases, (3) live stock improvement and (4) the enforcement of the Agricultural Wages (Regulation) Act. Each division of the inspectorate is under the general control of a Chief Commissioner or Inspector at headquarters, who is assisted by District Commissioners or Divisional Inspectors at the principal provincial centres. These in turn are in charge of the Inspectors and Assistant Inspectors in each district. A large part of the time of the Inspectorate has to be occupied in travelling. They have to visit infected farms, attend meetings of local authorities, inspect Colleges and Farm Insti-

tutes, investigate complaints as to agricultural wages and generally make themselves acquainted with the farmers and farming conditions of their districts. The cost of travelling is therefore a substantial part of the Ministry's budget, and this expenditure is closely watched to see that journeys are arranged in the most economical way and that the cheapest means are used. Each Inspector has to keep a diary of his movements and work which has to be approved by his superior officer and is then examined by the Finance Branch of the Ministry with his account of expenses before it is finally approved and paid. The fishery officers of the Fisheries Division are stationed at the principal ports round the coast and are under the control of a Chief Inspector at headquarters.

The administrative and clerical staff of the Ministry is normally recruited from the list of successful candidates at the examinations held by the Civil Service Commissioners for the Civil Service as a whole. But in recent years the ordinary examinations have been largely suspended, in order to provide for the entry into the permanent ranks of the Civil Service of considerable numbers of ex-Service men, in recognition of the services they rendered to the country during the Great War, and 63 per cent. of the total staff of the Ministry (men and women) are ex-Service men. This policy has been generally approved, and was obviously right and proper, but it has had one disadvantage in that it has resulted in the employment of men of mature years on work which would be more appropriate for youths. It has produced an ill-balanced age grouping throughout the service, which does

not conduce to the maximum efficiency or economy. It is expected, however, that open competition will soon be resumed, which will in time correct the anomalies.

In addition to the recruitment of new entrants from outside the Service, a considerable number of the higher posts in the Ministry have been filled by promotions from the lower ranks of the Service. In old days there was often a great gulf between the First Division of the Civil Service, who filled the administrative posts and were recruited from the Universities, and the Second Division, who did the clerical work and entered straight from school. It was a gulf which was rarely crossed in the majority of Departments, but in this respect the Ministry of Agriculture has been exceptional. More than half of the administrative staff of the Ministry began their careers in the Second Division of the Civil Service, and it has always been the policy of the Department to afford all possible opportunities of advancement to capable junior members of the staff, irrespective of rank or label. It is said that in one large Department of the State it was once solemnly proposed that, in order to mark the proper differentiation of rank, the use of the main staircase should be restricted to the First Division members of the staff, who should wear tall hats and tail coats, while the Second Division, in bowlers and short coats, approached their work by the back stairs. That may be a fable, though it indicates an attitude which undoubtedly existed at one time, but in any case it has completely disappeared now, largely as a result of the War, when

men of all ranks showed that they were capable of undertaking successfully the most responsible duties.

One respect in which there has been a great change in the staffing of Government offices is the increased employment of women. They are now eligible for appointment to any post in the Civil Service, and have been successful in open competition with men at all the examinations, including that for the administrative class. About one-sixth of the staff of the Ministry are women, most of whom are employed as typists, though there are also a considerable and increasing number of women clerks. In view of the capacity which has been shown by the women in the Service it is curious to recall the trepidation with which their advent was regarded by many experienced administrators thirty years ago. The first woman typist employed by the Ministry entered the Department in 1892. She was secluded in a dingy little room in the basement of the office, and the Chief Clerk of the Department issued an imperative order that no member of the staff over the age of 15 was to enter her room. Before that time all letters issued from the Department were copied by hand and dictation was unknown. Now a staff of over 100 shorthand-typists and typists is busily engaged, and their work adds enormously to the convenience and celerity with which the business of the Department is carried on.

It might be thought that, in a Department like the Ministry, which is responsible for much work of a technical character, it would be preferable to recruit the staff specially rather than to draw them

from the examinations which are common to the Civil Service as a whole. It has been found, however, that to enlist men who have received a good general education in the schools and universities, and to give them a thorough training in the routine of a Government Department, produces a type of administrator who is adaptable to many different branches of work, and acquires a capacity to deal effectively with all the ordinary functions of Government. Such work as the administration of Acts of Parliament, the handling of Local Authorities, the preparation of statistical or economic reports, financial control, the management of staff and office organisation is as a rule better performed by men who have grown up and been trained in the machinery of Government than by men who have been trained for a different career and enter a Government Department in middle age. Nothing would be gained and much would be lost by staffing the Ministry of Agriculture and Fisheries with nothing but practical farmers and fishermen. They would have little or no opportunity of making use of their practical knowledge, for the Ministry does not farm or fish, except to a very limited extent, and the bulk of the work of the Department calls for qualities which the practical farmer or fisherman would have had no opportunity of acquiring. A little knowledge is a dangerous thing, and in dealing with the men who are practically engaged in the industries which the Ministry exists to serve, it is far better that the ordinary staff of the Department should make no pretensions to be experts. The important thing is that they should have open and

adaptable minds, and the capacity to exercise a sound judgment on the advice or proposals, often divergent and contradictory, which come before them from the experts and the practical men of the industry. There is a distinct technique of administration which must be learnt, and it must be combined with a sense of proportion and a recognition of political, financial and practical limitations with which the specialist is often impatient. In order to develop these qualities of adaptability and sound judgment, it is the practice of the Ministry to regard its administrative and clerical staff as interchangeable between the different Branches of the Department, so that they may acquire as far as possible a good general knowledge of the work of the Department as a whole, and give them a wider outlook than if the whole of their careers were spent on the same duties.

At the same time, as has already been stated, the work of the Ministry could not be carried out without the employment of a large number of specialist officers, whose work, though different in character, is just as important as that of the administrative and clerical staff. This specialist staff has, however, to be recruited in a different manner. It is necessary to secure men who have received a professional training and have had some professional experience, and they must therefore enter the service of the Department at a later age than the administrative and clerical staff, and, as a rule, by some other method than competitive examination. The practice of the Ministry is to engage men of about 28 years of age who have either taken a degree in

science at the University, or completed their training as a Veterinary Surgeon or Land Agent and have subsequently practised their profession or otherwise acquired practical experience. Applications are invited by public advertisement, and the selection is made by a Departmental Selection Board, which includes a representative of the Civil Service Commission. The actual appointments are made by the Minister on the recommendation of the Selection Board, though he is not bound to accept their nominee. In practice, however, he always does so, as this method avoids the evils of a system of private patronage, and relieves the Minister from the pressure of political and personal influence in favour of particular candidates, to which he would otherwise be subject.

There is so much public interest in the question of the cost and number of the staffs of Government Departments that it may be pertinent to say that the staff of the Ministry is constantly subjected to overhaul and examination both from within and from without the Department, in order to secure that it is not excessive in numbers or cost for the work entrusted to it by Parliament. All proposals for increases of staff or salaries are critically examined by the Establishment Division of the Ministry before they are submitted to the Treasury, whose sanction is necessary before they can be put into operation. In addition, from time to time the whole organisation of the Ministry is reviewed either by an independent committee of business men or by the Estimates Committee of the House of Commons. Two such investigations have taken

place in recent years. A special committee appointed by the Cabinet in 1920 reported that their general impression of the methods of work and the staffing arrangements of the Ministry as a whole was a very favourable one, and the Estimates Committee reported in 1926 that the administration of the Ministry was efficient and that the enormous increase in expenditure since 1914 was due to a line of policy imposed upon the Ministry by Parliament, for which the Ministry could not be held responsible.

Whitley Council

An important part of the Departmental machinery for promoting efficiency of work and good relations among the staff is the Departmental Whitley Council. The application to the Civil Service of the system of Joint Industrial Councils associated with the name of Mr. Whitley presented some difficulties, as the employer of the staff of a Government Department is the State. The solution decided upon was that the employers or official side of the Council should be composed of senior members of the staff holding responsible positions who are appointed by the Minister and have to express the views of the Government. The staff side is composed of other members of the staff who are appointed by the Associations or Unions having members employed in the Department. The object of the Council is to secure the greatest measure of co-operation between the administration in its capacity as employer and the general body of the staff, with a view to increased efficiency and the well-being of

those employed ; to provide machinery for dealing with grievances, and to bring together the experience and different points of view respecting conditions of service within the Department.

So far as the Ministry is concerned, the Departmental Whitley Council serves a very useful purpose, and has worked smoothly and well. It is composed of ten members on the official side and eighteen members on the staff side, and it includes representatives of the Ordnance Survey and of Kew Gardens as well as of the Ministry itself. The Permanent Secretary of the Ministry acts as Chairman, and the Chairman of the staff side is the Vice-Chairman of the Council. Meetings are held once a quarter or more often if necessary. Decisions have to be arrived at by agreement between the two sides, and when agreement is reached they become operative. The official side have therefore to take care not to commit themselves to any proposal until they have ascertained that it is in accordance with the policy and views of the Government. If agreement cannot be arrived at, the question can, in certain circumstances, be referred to the arbitration of the Industrial Court. District Committees have been established for the Ordnance Survey and for Kew Gardens at which questions relating to their particular needs are considered on the spot, and a record of their proceedings is submitted to the Departmental Council for confirmation.

The discussions at the Council are in the main concerned with matters affecting the pay and conditions of service of the staff, and the Council affords a useful opportunity of hearing -at first

hand any grievances or complaints. It also affords the official side an opportunity of explaining to the staff any changes in the organisation of the Department that may be in contemplation, and generally tends to promote a spirit of mutual confidence and goodwill. With the object of increasing the interest of the staff in the work of the Department, the Council has arranged from time to time a number of lectures at which well-known experts have given addresses on various topics of interest.

The Council has also applied to the Ministry a method for dealing with promotions based on the recommendations of a Committee of the National Whitley Council for the Civil Service as a whole. In former days promotions were made by the Head of the Department, subject, in important cases, to the approval of the Minister. The Head of the Department usually consulted the principal members of the staff, and used such other means as were open to him to arrive at a fair decision between the claims of competing candidates. But there was no systematic procedure for ensuring that all eligible candidates were considered, and the growth of the staff has made it impossible for the Head of the Department or any other individual to know enough of the work and capabilities of all of them to be able to arrive unaided at a fair judgment of their relative merits. Under the system now in force a report is made each year on the work, personal qualifications and fitness for promotion of every member of the staff. These reports are made by the officer's immediate superior and countersigned by the Head of the Branch or Division in which

he or she is serving. When a vacancy has to be filled by promotion, a departmental Promotion Board is appointed consisting of some of the Assistant Secretaries of the Ministry, the heads of other Branches or Divisions and a representative of the Establishment Division. The Board considers the Annual Reports of all the eligible candidates supplemented by their own personal knowledge, and the staff side of the Whitley Council have the opportunity of making any representations to the Promotion Board either in writing or in person. The Board then makes a recommendation to the Head of the Department, by whom the appointment is made.

Sports and Social Activities

Civil Servants, like other people, have interests outside their work, and in recent years there has been a great development of corporate sport and of social gatherings of various kinds in the Civil Service. In the Ministry there is a flourishing Sports Association, supported by the contributions of the staff, to which are affiliated Clubs for Cricket, Football, Swimming, Rifle Shooting, Cycling, Golf, Table Tennis and Chess, as well as a Gramophone Society and a Glee Society. The Glee Society has been in existence for over twenty years and with the Ladies' Choir, which has been added to it in recent years, gives an annual Bohemian Concert, and also usually performs at the Ministry's Annual Smoking Concert. On one occasion some years ago the Glee Society had the honour of singing before Their Majesties King Edward VII and Queen

Alexandra at a dinner given by Lord Lincolnshire, when he was President of the Board.

A very successful institution in the Ministry is the Luncheon Club, which exists to provide meals at reasonable prices for the staff. At one time this and other similar Clubs received a small subsidy from public funds, but this was withdrawn a few years ago and the Club is now entirely self-supporting, except that rent is not charged for the room it occupies. The Club is used by from 500 to 600 persons each day, and over 130,000 lunches and 40,000 teas are served each year. It is very efficiently managed, as is shown by the fact that in the last four years the average profit has been less than £40 a year on a turnover of approximately £10,000 a year, and that an excellent lunch can be obtained for not more than 1s. 6d. Meals of similar quality would cost from 1s. to 1s. 6d. more at outside establishments, and this saving is a very material consideration to the staff, who, contrary to popular belief, are neither bloated nor overpaid bureaucrats.

Chapter IV

DISEASES OF ANIMALS I

Control and Eradication

THE control and extirpation of the diseases of farm live stock must always be the primary duty of the Department of State responsible for the welfare of the agricultural industry. No other single cause has inflicted such serious losses on farmers throughout the ages, since the days of the Plagues of Egypt and the murrain of boils and blains which destroyed their cattle, and no action on the part of farmers themselves is of any avail without some measures of control by the Government, both to prevent the introduction of disease from abroad and its spread when it appears in this country.

Throughout the Middle Ages and down to the eighteenth century there are records of serious epidemics among cattle, but little or no organised attempt was made to deal with disease. It was regarded as an unavoidable judgment of Providence, though methods of isolation were practised as far as possible. In 1714, however, and again in 1745, it is recorded that Cattle Plague or Rinderpest was introduced by imported animals from Holland, and orders were issued by the Government for the slaughter of affected animals and the payment of compensation. King George I contributed the

sum of £6,774 1s. 11d. as a Royal Bounty out of the Civil List towards the compensation paid in 1714, but in 1746 the first Act of Parliament was passed empowering the King in Council to make Orders for the suppression of the disease and providing for the payment of compensation out of public funds for the animals slaughtered. The outbreak of 1745 lasted for twelve years, and, though complete records are not available of the loss incurred, it is clear that it must have been very serious, since it is stated that no fewer than 100,000 cattle died in one year in the County of Lincolnshire alone. Another outbreak of Cattle Plague took place in 1769, which was quickly suppressed, and after that date the country remained free from the disease for nearly 100 years, though it was widely prevalent on the Continent throughout the period of the Napoleonic Wars, and at all times in Russia, which is the home of the disease.

One result of the introduction of Free Trade was the opening of the ports to foreign cattle and sheep, and in the year 1848 there was a serious outbreak of sheep-pox due to the importation of sheep from Germany. This led to legislation which laid the foundation of all the subsequent measures dealing with Animal Diseases. The Sheep and Cattle Prohibition Importation Act, 1848, empowered the issue of Orders in Council to prohibit the importation into the United Kingdom of cattle, sheep, horses or other animals in order to prevent the introduction of disease, and also the issue of regulations to require quarantine or slaughter, and to destroy hay, straw, fodder or

other articles which might convey contagion. Another Act entitled the Sheep and Cattle Contagious Disorders Prevention Act empowered the Privy Council to make Orders controlling the movement of animals in this country, providing for disinfection of infected premises and vehicles, requiring notification of disease, and dealing with the disposal of affected carcases. Both Acts passed through Parliament without discussion, except for a characteristic speech by Lord George Bentinck, the champion of Protection, in which he welcomed them as the first step towards the repeal of the Free Trade Policy, and expressed the hope that they would not be the last measures to be brought forward "in order to render nugatory these Free Trade Acts which had been productive of so much alarm and so much mischief." It is significant of the feeling of the farmers on the subject that the popular name of the disease in agricultural circles was Peel's Pox, which conveyed their opinion of Sir Robert Peel in connection with his adoption of the policy of Free Trade.

The two Acts of 1848 were originally of a temporary character, but they were continued in operation by subsequent Acts, and it was under their provisions that the earliest action was taken to deal with the serious epidemic of Cattle Plague which devastated the herds of this country from 1865 to 1867.

This epidemic, which was first discovered in some dairy cows in Islington in June, 1865, is believed to have been caused by the importation of a cargo of Russian cattle from Estonia, which were ~~shipped~~

direct from Revel to Hull, and some of which were sold in the Metropolitan Market at Islington.

The disease spread with alarming rapidity throughout the country. The veterinary advisers of the Cattle Plague Department which was established to deal with the epidemic, believed that the policy of stamping out the disease by slaughter, coupled with the prohibition of importation from countries where disease was prevalent, would be the only effective remedy. But there was great difference of opinion in agricultural circles, and a Royal Commission which was appointed in September, 1865, recommended in an Interim Report the withdrawal of the power of slaughter which had been conferred by an Order of the Privy Council in August. By the end of the year, however, the spread of the disease throughout the country, and the complete failure of all other methods to check its progress, converted the Royal Commission to the necessity of slaughter, and Parliament adopted the same view.

In the Speech from the Throne at the opening of Parliament in 1866, Queen Victoria said, "I have observed with great concern the extensive prevalence during the last few months of a virulent Distemper among cattle in Great Britain." An Act of Parliament was rushed through both Houses in a week requiring the compulsory slaughter of all animals affected with the disease, and permitting the slaughter of any animals that had been in contact with them. The effect was immediate. Whereas 18,000 fresh cases of the disease were reported during the week when the Act was passing through Parliament, there was a steady reduction in each sub-

sequent week. In June, 1866, there were only 743 fresh cases in a week, in September only 80, and by September, 1867, the country was declared completely free of the disease.

The losses sustained by the farmers of the country were colossal. No less than 27,846 separate farms were attacked by the disease, and three out of every four of the cattle on them perished. The official returns give particulars of 279,000 cattle affected, of which 133,500 died and 100,000 were slaughtered. In addition 57,000 healthy cattle were slaughtered to prevent the spread of the disease. But the official returns do not reveal the full extent of the loss. Many cases were not reported, and it was estimated by the Royal Agricultural Society that the total number of cattle lost exceeded 400,000, or 10 per cent. of the total herds of the country. The value of the stock lost was certainly not less than £5,000,000, without reckoning anything for the serious indirect loss due to the disease.

The experience of the Cattle Plague epidemic of 1865-7 led to the passing of the Contagious Diseases (Animals) Act, 1869, which conferred extensive powers upon the Privy Council and upon Local Authorities to deal with animal diseases, including pleuro-pneumonia and foot and mouth disease, as well as cattle plague and sheep-pox. Certain foreign countries where disease was prevalent were scheduled under the Act, and animals imported from them were required to be slaughtered at the ports. In case of cattle plague appearing in this country the Act contained power to require the slaughter of affected and contact animals, but

there was no power of requiring the slaughter of healthy animals which had not been in contact with disease.

It was recognised by the veterinary authorities that nothing short of complete prohibition of importation from abroad, and the obligation of slaughter when disease broke out, would remove all risk of its introduction and spread, but neither Parliament nor agricultural opinion was prepared for such drastic measures, and even the less rigorous measures contemplated by the Act of 1869 were not effectively enforced. It was not long before proof was forthcoming that sterner measures were necessary. In 1872 a cargo of Russian cattle arriving at Hull was found affected with cattle plague, and notwithstanding that the cattle were slaughtered on board and buried at sea, the disease was communicated to Hull Market by mediate contagion conveyed by human beings, and from the market it spread to twenty-three separate centres in Yorkshire. After three months it was stamped out by slaughter and rigorous restrictions, but it was stated at the time that if there had been power to order the slaughter of three small herds of thirty animals adjoining though not in contact with the original case, the disease could have been confined to the original outbreak.

Again in 1877 cattle plague was introduced by a cargo of German cattle sent from Hamburg to Deptford where they were slaughtered in the landing place. The disease was conveyed to several centres in London and it spread to forty-seven premises in five different counties before it was finally stamped out.

No case of cattle plague has occurred in this country since 1877, but the lessons of the previous outbreaks and the losses sustained from pleuro-pneumonia and foot and mouth disease, led to the replacement of the Act of 1869 by that of 1878, which laid the foundation of the methods which are now in force. The Act of 1878 and its subsequent amendments were consolidated by the Diseases of Animals Act, 1894, which, subject to certain minor amendments, embodies the code of procedure which is still in force for dealing with animal diseases.

The history of the legislation on the subject shows that the measures were gradually increased in severity, both as regards the importation of animals from abroad, and the restrictions necessary to prevent the spread of disease in this country by compulsory notification, control of movement, and, in the case of certain diseases, slaughter of the affected and contact animals and the payment of compensation out of public funds. The process was a gradual one. It was dependent upon the readiness of stockowners to put up with onerous restrictions on their freedom, and upon the readiness of Parliament, as representing the consumers, to face the loss to the food supply of the store and fat animals which had previously been imported from countries where disease was prevalent. Both parties were only gradually convinced that freedom from disease would stimulate production in this country, and that any necessary supplies from abroad would be forthcoming in the form of dead meat rather than of live animals.

At one time many farmers held the view that restrictions on the free movement of animals were

more detrimental than disease, but their attitude changed as a result of their experience of the epidemics of the nineteenth century. On the other hand, a considerable body of opinion in Parliament contended that the closing of the ports to live animals would seriously endanger the food supply, but the enormous increase in the dead meat trade has falsified that fear and has greatly reduced the suffering due to the carriage of animals by sea.

At the present time, owing to the presence of disease throughout the Continent of Europe and in most other parts of the world, the only cases in which cattle, sheep or pigs are admitted alive into this country, except from Ireland, are—

- (1) Store cattle incapable of breeding from Canada under the Importation of Animals Act, 1922.
- (2) Fat cattle from Canada, the United States of America and the Union of South Africa, subject to slaughter at the ports of landing.
- (3) Pedigree breeding stock from the British Empire, subject to such period of quarantine as is considered necessary ; and
- (4) Animals admitted for exhibition or other exceptional purposes, which are also subject to strict quarantine.

With regard to the control measures enforced in this country, the Act of 1894 confers a very wide discretion upon the Ministry, which is empowered to make any Orders that it considers necessary to prevent the spread of disease. The powers of the Ministry afford a striking example of subordinate legislation, having the force of an Act of Parliament,

but imposed or removed at the sole discretion of the Minister. Whatever opinions may be held as to the constitutional propriety of subordinate legislation in general, it will probably be agreed that it could not be avoided in dealing with disease, when instant action to meet the particular circumstances of each outbreak is essential. At any moment a telegram may arrive announcing a reported case of disease, and some members of the staff of the Ministry have to be on duty at all times, day and night, and on Sundays as well as week-days, to issue the necessary orders to control the outbreak and prevent its spread.

The Diseases of Animals Acts, therefore, while indicating the general lines of the procedure to be adopted, empower the Ministry to prescribe the details by administrative orders. The Ministry is designated as the central authority for Great Britain, and the County Councils and the Councils of all Boroughs, which had a population of 10,000 or more at the Census of 1881, are appointed as the local authorities. The number of local authorities is 330 and they are required to execute and enforce the Acts and the Orders of the Ministry through the police and to appoint veterinary and other inspectors for the purpose.

Any disease may be scheduled by the Ministry under the Act and will thereupon become subject to any regulations imposed by Order. At the present time the scheduled diseases are the following: cattle plague, pleuro-pneumonia of cattle, foot and mouth disease, sheep-pox, swine fever, sheep scab, anthrax, rabies, glanders, epizootic lymphangitis,

parasitic mange in horses and donkeys, and bovine tuberculosis.

Of these diseases, cattle plague, pleuro-pneumonia, sheep-pox, epizootic lymphangitis and rabies have been eradicated. No case of sheep-pox has occurred since 1850, of cattle plague since 1877, of pleuro-pneumonia since 1898, of epizootic lymphangitis since 1906, and of rabies since 1921. Our insular position and the restrictions on importation should prevent any reintroduction of those diseases, but constant vigilance is necessary, particularly as regards the introduction of rabies by dogs which from time to time are attempted to be smuggled into the country. Several cases have occurred in which smuggled dogs have been seized and, though apparently in perfect health, have developed rabies in quarantine after periods of as much as six months. The credit for the eradication of rabies is largely due to Mr. Walter Long (afterwards Viscount Long) who as President of the Board insisted, in the face of great popular opposition, on the maintenance and enforcement of muzzling orders throughout the country.

The diseases to which we are still subject may be divided into two classes, viz. those diagnosed by the Ministry and those diagnosed by the local authorities. In the first instance, the whole of the work was placed in the hands of the local authorities, but gradually it was found expedient to place the control of many of the more serious diseases in the hands of the central authority, in order to secure uniform administration. At the present time the Ministry is responsible for foot and mouth disease and swine fever, and the local authorities for

anthrax, sheep scab, glanders, parasitic mange and bovine tuberculosis, though in the case of anthrax the diagnosis is subject to confirmation by the Ministry.

The method of dealing with the different diseases varies considerably. In the case of foot and mouth disease, slaughter of the affected and of all contact animals is adopted, save in very exceptional cases of pedigree herds where isolation is practicable. In swine fever, slaughter as a stamping-out policy was given a prolonged trial at great expense but without success, and it was abandoned in 1915 in favour of control measures coupled with serum treatment. Anthrax is practically always fatal and slaughter is expressly prohibited, as the spilling of the blood which swarms with anthrax bacilli is attended with great danger to human beings as well as animals. Sheep scab and parasitic mange are dealt with by remedial measures. Slaughter is adopted in the case of glanders, which has almost completely been eradicated, and in the case of cattle seriously affected with tuberculosis.

Provision is made for the payment of compensation to the owners of slaughtered animals, except dogs and cats, but the scale of compensation varies in the case of different diseases. The compensation is not paid to reimburse owners for losses incurred through outbreaks of disease among their flocks and herds. Such losses are ordinary trade risks incident to the industry and are to some extent insurable. Compensation is paid because the Ministry or the local authority acquires compulsorily the ownership of animals, which are then slaughtered in the public

interest to prevent the spread of the disease. Refusal to pay compensation for such animals would amount to confiscation, and would also lead to the concealment of disease, particularly in the case of foot and mouth disease, which is usually not fatal. No compensation is paid for any indirect losses due to disease or to restrictions imposed on the business of the farmer.

In the case of animals slaughtered on account of foot and mouth disease the full value of the animal is paid without any deduction due to its diseased condition. This is exceptional, but justifiable because the disease is not usually fatal and the animal would in most cases recover its health in time. In other diseases a deduction is made in the case of affected animals. In the case of swine fever, when slaughter is resorted to for purpose of diagnosis, half value is paid. In glanders, a quarter of the value is paid with a minimum of £2 for horses and 10s. for donkeys, and in tuberculosis a quarter value with a minimum of 45s. is paid in advanced cases and three-quarters value in the case of non-advanced cases. Any healthy animals slaughtered as contacts are paid for at full value. In default of agreement the value of the animals is settled by arbitration. Any receipts from the salvage of the carcases of slaughtered animals are retained by the Ministry or the local authorities.

The question whether the cost of compensation and the other expenses of administering the Acts should be paid out of the rates or out of the taxes has been a subject of controversy. In the first instance the charge was placed on the local rates,

except as regards the cost of the small staff of the Veterinary Department of the Privy Council. But when the central authority took over the responsibility for dealing with cattle plague the whole of the charge was placed on the Exchequer, and provision was also made for a Parliamentary Grant not exceeding £140,000 a year towards the cost of dealing with pleuro-pneumonia, foot and mouth disease and swine fever, of which not more than £50,000 was allocated to swine fever. Out of this £50,000, £11,000 was later transferred to the Irish Department, and the balance of £39,000 a year represents the existing Exchequer Grant towards the cost of dealing with Swine Fever in Great Britain. This grant has usually been sufficient to meet the total expenses of the Ministry in connection with swine fever since the abandonment of the slaughter policy.

No Exchequer Grant has been made in respect of glanders or any of the other diseases dealt with by the local authorities, except bovine tuberculosis, in which case the Exchequer defrays three-quarters of the gross compensation. The local authorities retain any receipts from the salvage of carcases, which go towards their own costs of administration and inspection.

At the present time, so far as foot and mouth disease is concerned, the cost is met in the first instance by the Ministry from the Cattle Pleuro-Pneumonia Account, established by the Act of 1894, which is fed by such annual Parliamentary Grants as are required (subject to the statutory maximum of £140,000 a year, less the provision for swine fever)

and by the receipts from the salvage of carcases. Any balance in the account at the end of a financial year is carried forward and is not liable to surrender. If the amount in the account is not sufficient to meet the cost of dealing with the disease, the Ministry obtains the balance required from the Local Taxation Accounts, and thereby diminishes the amount of the grants made from those Accounts to the local authorities. On two occasions, viz. in 1922 and 1924, the drafts on the Local Taxation Accounts would have been so large on account of the prevalence of the disease, that Parliament agreed in the special circumstances to remove the statutory limit of the Parliamentary Grant, and Supplementary Votes were passed providing increased grants from the Exchequer.

In recent years the problem of dealing with foot and mouth disease has assumed very serious proportions, and there has been much public controversy as to the methods adopted. The disease was first recorded in this country in 1839 and there were periodic outbreaks of varying extent in most subsequent years. No action was taken to control it until in 1869 it was made notifiable and local authorities were empowered to regulate the movement of contact animals and to require the disinfection of infected premises. These powers were very unevenly exercised and had little or no effect in checking the disease. A serious outbreak took place in 1871 and is said to have attacked 3,000,000 animals. In 1873 a Select Committee of the House of Commons reported that it was hopeless to extirpate or even materially check the disease unless stringent

measures, such as the stoppage of fairs and markets and of the movement of animals except by licence, were adopted and that such measures would meet with strong opposition and could not be enforced. Accordingly the attempt to control the disease was abandoned for a time, but renewed efforts were made under the Act of 1878, which aimed at confining the disease to declared infected places, into or out of which movement of animals was prohibited, while leaving the movement of animals in the rest of the country as free from restriction as possible. In spite of these measures the disease continued prevalent, and in 1883 no less than 18,732 outbreaks were reported distributed all over the country. In the following year local authorities were for the first time empowered to slaughter affected and contact animals and to pay compensation, and about the same time power was given to make orders prohibiting or regulating the movement of animals from the district of one local authority to another or from Ireland. Very little use, however, was made of the power to slaughter, as no local authority would exercise it when it had no safeguard against the risk of the immediate reintroduction of disease from an adjoining county not equally prepared to adopt the policy of eradication. Finally in 1892 the power of slaughter was conferred on the Board of Agriculture and from that date a vigorous attempt was made to stamp out the disease by the immediate slaughter of affected and contact animals, and by the restriction of movement on a uniform plan throughout the country. The efforts made were attended with considerable success. In the twenty-

five years from 1893 to 1918 inclusive, the total number of outbreaks was only 235, an average of less than ten a year. In twelve of those years there were no outbreaks of the disease at all, and the number of animals attacked only exceeded 500 in three years out of the twenty-five.

Since 1918 there has been a serious recrudescence of the disease, beginning on a small scale in the years 1919 to 1921 and increasing to alarming proportions in 1922 to 1924. In those three years there were 4,509 separate outbreaks in Great Britain and 273,283 animals were slaughtered, of which 136,064 were cattle, and the cost to the country was approximately £4,000,000.

This heavy expense made it necessary to consider whether the policy of slaughter could be continued and whether some less costly but equally effective means could not be found to deal with the disease. The matter was considered by two Departmental Committees in 1922 and 1924, but they recommended unanimously the maintenance of the slaughter policy and their opinion is endorsed by the great bulk of agricultural opinion. On the other hand it is contended in some quarters that as the disease is curable, and affected animals generally recover, the slaughter policy is wasteful and unnecessary and that the spread of the disease could be controlled by measures of isolation. The answer to this contention may be found in past experience in this country before the adoption of the slaughter policy and in the present experience of all other European countries. No attempt is made to eradicate the disease by slaughter on the

Continent, with the result that it has become endemic, and though the deaths are not numerous, the losses falling on the farmers owing to deterioration in the condition of their stock and to reduction of breeding and of the supply of milk, are very serious. It is estimated that the loss in France alone in consequence of the disease amounts to £5,000,000 a year.

The crucial fact in regard to foot and mouth disease is that it is exceptionally infectious. If one animal in a herd is attacked with the disease it is practically certain to spread to all the others not only in the same herd, but in the neighbourhood. Each diseased animal is an active manufacturer of the virus, which is carried from animal to animal by the fact of their being together in buildings or on the pastures, or by the hands of milkers or by the hands, boots or clothes of other attendants. Under certain conditions the virus may remain active for months and it can be carried long distances. A road along which infected animals have passed, a stream from which they have drunk, and a vehicle in which they have travelled may remain infective for some time. The virus may be carried by food-stuffs, by dogs, fowls, rats and birds and it can be blown through the air by the wind.

The consequence is therefore that the most effective means of preventing the spread of the disease is to stop the manufacture of the virus at the earliest possible time, and this can only be done by the immediate slaughter of the affected animals and animals with whom they have been in contact, and the thorough disinfection of the premises.

The only possible alternative is effective isolation, but this is only practicable in exceptional circumstances. The animals must be housed in buildings which can be rendered rat and bird proof, the most meticulous precautions must be taken to segregate the attendants and prevent their carrying infection outside, and rigorous supervision must be maintained until the disease has run its course and all the animals have ceased to be infective, which may take four or five months.

It is impossible to secure these conditions when disease is widely prevalent, and they are obviously impracticable in regard to sheep. Only a small proportion of the farm stock of the country can be housed under cover, and isolation in open fields would be quite ineffective to prevent the spread of an air-borne disease. Moreover, a policy of isolation would involve the maintenance of restrictions on neighbouring farms for a much longer period than is necessary when slaughter is adopted and the disease is stamped out at once.

The problem of keeping this country free from those diseases of animals which are not endemic in our flocks and herds is mainly dependent on the restrictions which have been imposed to prevent the introduction from abroad of fresh sources of disease. Our insular position gives us special advantages in this respect, which are only limited by the fact that we are not self-supporting in regard to food, and that therefore considerable quantities of imported food are required. It has been found possible, however, without undue interference with the food supply, to prohibit the introduction of any proved

sources of infection. The most notable example was in regard to the trade in live animals from abroad. This trade from any infected countries was finally prohibited in 1892, and the deficiency has been more than made up by the great development of the dead meat trade, particularly from South America. In spite of these precautions we still remained subject to invasions of foot and mouth disease, and it was not till 1926 that one at least of the causes of these invasions was definitely ascertained. An outbreak of foot and mouth disease occurred on a farm in Lanarkshire, which was adjacent to a bacon factory which had been receiving from Holland weekly consignments of pig carcases for curing. Several of the carcases at the factory were found to be diseased, and other diseased carcases from the same shipment were found at three other places. Diseased carcases were found in two subsequent shipments from Belgium and Holland, and there is no doubt that the importation of these carcases of pigs, which had been slaughtered when suffering from the disease, had been the cause of its introduction to this country. In these circumstances the Ministry had no alternative but to prohibit absolutely the importation of all fresh meat from the Continent of Europe in view of the extensive prevalence of foot and mouth disease in all Continental countries. No system of inspection of the meat on its arrival here would have afforded security, since the most dangerous infection comes from the carcases of animals killed in the incubative stages of the disease, when no signs of it are visible on the carcases.

Chapter V

DISEASES OF ANIMALS II

Research, Treatment and Protection during Transit

IN the preceding chapter an account has been given of the methods adopted for eradicating disease by slaughter and control. But it is recognised that these are methods only adopted in default of the discovery of less barbarous and expensive measures. It is therefore one of the most important duties of the Ministry to undertake and stimulate scientific research into the diseases of animals, in the hope that discoveries will be made which will lead to new methods of diminishing the losses due to disease by prevention or cure.

The most important problem is that of foot and mouth disease, in view of the serious cost of the slaughter policy. The disease, like many of the prevalent human diseases, such as influenza and scarlet fever, is believed to be caused by an ultra-visible virus, which cannot be seen by the most powerful microscope, and can pass through the minute pores of bacterial filters. Its nature is not definitely known, but it is probably bacterial.

Foot and mouth disease is very prevalent throughout Europe, and for many years research into the disease has been carried out in many Continental countries, particularly in France and Germany. No material discovery of practical value

has, however, been made, though in 1924 Professors Frosch and Dahmen of Berlin reported that they had succeeded in rendering the virus visible by photographic processes, and in cultivating it in tubes for twenty-five generations. Subsequent investigations, however, failed to confirm their claim and it must be regarded as doubtful.

The fact that foot and mouth disease is the most highly contagious of all known diseases has made stockowners averse to any attempt to experiment with the disease in this country, for fear that the virus might escape from the experimental station and spread to farms in the neighbourhood. Accordingly, so long as the country was comparatively free of the disease no experimental work was permitted, but on two occasions scientific research into the disease was undertaken on behalf of the Ministry elsewhere.

In 1912 a small Committee was sent to India, where the disease is prevalent, to carry out scientific experiments there. After six months' work it was found that the indigenous cattle, sheep and pigs of the plains of India were so highly insusceptible to the disease that they were useless for experimental work which would be of value in regard to British conditions, and the investigation was therefore abandoned.

In 1920 another attempt was made. A Committee was appointed to investigate the viability of the virus, its identification and artificial cultivation, and practicable methods of prevention and immunisation. On this occasion, in order to avoid the risk of spreading infection, the experiments were

carried out on an obsolete warship and an attendant lighter moored in the estuary of the River Stour near Harwich. After eight months' inconclusive work it was found that there were insuperable difficulties in carrying out investigations afloat, and that much more extensive accommodation for animals was essential. The investigations were therefore brought to a close.

The serious epidemics in 1922-24 again brought the question to a head and there was a strong demand in Parliament for further scientific investigation, in view of the heavy cost of the slaughter policy. A Committee of distinguished scientists, medical and veterinary, was therefore appointed in 1924 and endowed with sufficient funds to carry out a thorough investigation over a period of years. The Ministry has placed at the disposal of the Committee a set of suitable buildings and land at Pirbright, which is surrounded by heath land, so that the risk of spreading infection is reduced to a minimum. The work of the Committee is still in progress and it is impossible to say whether or how soon success will be achieved. Experiments are being undertaken on guinea pigs and other small animals, as well as with ordinary farm stock, but, up to the present, attempts to cultivate artificially the virus have failed. Similar investigations are being made at the Lister Institute of Preventive Medicine and at the Ministry's Veterinary Laboratory at Weybridge, and subsidiary experiments are being made at the University of Liverpool.

Apart from the special inquiries into Foot and

Mouth Disease, the Ministry is responsible for much other scientific research into Animal Diseases. A considerable amount is carried on at the Ministry's Veterinary Laboratory at Weybridge, which was erected in 1914 at a cost of £30,000 from funds provided by the Development Commissioners.

One of the functions of the Veterinary Laboratory has been the preparation of a vaccine for giving cattle a resistance against contagious abortion, a disease which is alarmingly prevalent throughout the country, and causes most serious losses. The bacillus of the disease was discovered in 1897 and a scientific Committee which sat in 1905 ascertained that it was possible to diagnose the disease by an agglutination test, so that affected animals could be picked out of a herd before they abort and spread infection, and that animals could be endowed with a high degree of resistance to the disease before they became pregnant, by injecting large doses of living culture of the abortion bacillus. The practical application of the agglutination test was worked out at the Royal Veterinary College, Camden Town, and the preparation of an anti-abortion serum was undertaken at the Veterinary Laboratory of the Ministry. It is necessary that the use of the serum should be controlled, and it is only useful when given to non-pregnant animals. Its manufacture is therefore retained in the hands of the Ministry, and it is only issued to veterinary surgeons for use in herds already infected with the disease, as it would be unwise to introduce infective material to clean herds. The number of infected herds is, however, very large indeed, and from 25,000 to

30,000 doses of the serum are sold annually. Although the cost of the doses (2s. 6d. each) is only about half of what would be charged if they were manufactured commercially, a profit of some £2,000 a year is realised for the Exchequer from the business.

At one time the Veterinary Laboratory also undertook the manufacture and sale of a serum against Swine Fever, but this has now been taken over by commercial firms. The serum will not cure pigs already affected, but it may reduce the losses by protecting for a short period non-affected pigs from a damaging attack of the disease. It will also render them actively immune in future if they are allowed to catch the disease in a mild form by contact with affected pigs immediately after serum treatment.

The staff of the Laboratory have also been engaged in investigating diseases of sheep, such as Louping Ill, Scrapie, and Northumberland lamb disease, and recently special attention has been paid to the diseases of poultry. Valuable work has also been done by devising a means of immunising cattle against Tropical Redwater, a disease which is prevalent in South and East Africa. By this means it has been found possible to protect cattle exported from this country from contracting the disease on their arrival overseas, and has thereby helped to increase the trade in British pedigree stock.

The Veterinary Laboratory is, however, mainly concerned with the diagnosis of the diseases scheduled under the Diseases of Animals Acts, and it is prin-

cipally maintained therefore for administrative purposes, rather than as a Research Institution. In connection with diagnosis, the Laboratory succeeded in developing a new and reliable method of diagnosing Rabies, by which the time necessary to obtain a definite diagnosis has been reduced from three weeks to about ten hours. This is of great advantage, not only because it avoids delay in putting into force measures of control, but also because human beings who have been bitten by a dog suspected of Rabies can be informed at once whether or not they should be inoculated against Hydrophobia.

The general policy of the Ministry in regard to research has been to entrust it to Universities or to special Institutions in order that the research workers may have greater freedom than would be possible if they were Government officials. In accordance with this policy two Institutes for Research in Animal Pathology have been established out of funds provided mostly by the Ministry. One Institute has been established at the Royal Veterinary College, Camden Town, and the other at the University of Cambridge, where a new Professorship of Animal Pathology has been endowed by a grant of £30,000.

At the Royal Veterinary College investigations are being made into contagious abortion in mares, Johne's disease, mastitis in cows and quarter evil in cattle. At Cambridge, special attention is being paid to work on tuberculin tests, to the preparation of a serum for Swine Erysipelas and to Abortion of Ewes and Joint Ill of Lambs.

As a supplement to the work of the Research Institutes in Animal Pathology, the Ministry has recently established an Advisory Service in Veterinary Science by appointing Veterinary Advisory Officers, who are attached to the principal Agricultural Colleges. These Advisory Officers carry out local investigations, and are responsible for the study of the prevalent diseases in a group of counties, and for giving specialist advice. Though they are attached to the Colleges, they only do a very limited amount of teaching, and they spend most of their time moving about their districts to study and advise on disease questions which are beyond the scope of the ordinary veterinary practitioner, or which require special investigation. The Advisory Officers form a link between the Research Institutes and the College and County staffs, they assist in disseminating to the farmers a knowledge of the results of research, and their work is co-ordinated through the Animal Diseases Research Committee, of which they and the Directors of the Research Institutes and the Ministry's Chief Veterinary Officer are members.

Among the diseases which are scheduled under the Diseases of Animals Act, and which are compulsorily notifiable, there are some which are dealt with by methods of treatment prescribed by Orders of the Ministry. The principal of these is Sheep Scab. Under the Diseases of Animals Act, 1903, the Ministry is empowered to make Orders prescribing the periodical treatment of all sheep by effective dipping, or by the use of some other remedy for sheep scab, and authorising Local

Authorities to make regulations for the same purpose. If Sheep Scab occurs in a flock, the owner has to report it to the police, and, if the diagnosis is confirmed by a Veterinary Inspector of the local authority, a notice is served on the owner of the sheep requiring him to cause all the sheep to be thoroughly dipped in an efficient sheep dip at least twice, with an interval of not less than seven days and not more than fourteen days between the dippings.

Sheep Scab is due to the presence on the skin of sheep of a species of parasite or acarus which pricks the skin, produces irritation and scabs, and causes the shedding of the wool. The object of the dipping is to kill the parasites. The eggs of the female parasite are hatched in about seven days, and it is necessary therefore to dip the sheep twice in order to destroy the parasites which have hatched out since the first dipping. The second dipping is required therefore after a sufficient interval to permit of the hatching of the eggs, and before the young parasites arrive at maturity and can lay more eggs and spread infection.

The composition of the sheep dips has to be approved by the Ministry, and the substances most commonly employed are preparations of white arsenic, carbolic acid, tobacco juice or sulphur. Farmers may either compound their own dips, for which purpose three different prescriptions have been approved by the Ministry, or they may use one of the proprietary dips, of which over four hundred have been approved. Some of the arsenical dips, while effective against sheep scab, may cause the

death of the sheep by poisoning if used twice within a short interval, and the Ministry has therefore recently prohibited the use of arsenical dips for the second dipping.

The Acts relating to Diseases of Animals confer very wide powers on the Ministry of Agriculture. It is authorised to make Orders of every conceivable kind which may prevent the spread of disease or assist in the execution of the Acts. These powers have been used at different times to prohibit fox hunting and the holding of a race meeting and coursing matches, and during the serious epidemic of foot and mouth disease in Cheshire in 1923 the question was seriously considered whether restrictions should not be imposed on the movement and congregation of human beings in view of the belief that disease was being spread at village whist-drives and dances, or by attendance at football matches or church services. But though such measures would no doubt have assisted in preventing the spread of disease, it was felt that they were more than the public would stand and they were not adopted.

The Acts also contain certain humanitarian provisions for protecting animals from suffering during transit on land or by sea and for securing to them a proper supply of food and water. The general law for the prevention of cruelty to animals is under the administration of the Home Office, but the Ministry of Agriculture has made Orders under its powers derived from the Diseases of Animals Acts which have done much to render the transit of animals free from any avoidable suffering or

discomfort. So far as transit by sea is concerned, animals imported into or exported from this country must be carried in vessels which are properly fitted for the purpose in accordance with the requirements of the Ministry. Provision is made to prevent overcrowding, to require a sufficient number of qualified attendants, to ensure adequate supplies of food and water, and to require the provision of pens so constructed as to withstand the weather and furnished with proper footholds. In the case of inland transit the Railway Companies are required to carry animals in suitable trucks provided with spring buffers and fitted with proper footholds, overcrowding is prohibited, and a supply of water has to be provided at every railway station at which animals are habitually loaded and unloaded or detained in transit. Special provisions are also made for the conveyance of live poultry, to protect them from exposure to bad weather or excessive heat, to ensure adequate ventilation, to prevent overcrowding or the use of unsuitable receptacles, and to require the provision of food and water whenever necessary.

The trade in the exportation of horses from this country to the Continent has required the passage of special legislation by Parliament and the making of special Orders by the Ministry for the prevention of suffering. There is a demand on the Continent for horse flesh for human consumption, and, to the extent to which this demand is supplied by the export of old horses from this country, it arouses feelings of natural repugnance among English people to whom the horse is a special favourite among animals. Accordingly Acts of Parliament were

passed in 1910 and 1914 which prohibit the export of any horse unless it has been examined by a veterinary surgeon, and is certified by him as fit to be conveyed and disembarked without cruelty and to be capable of being worked without suffering. Further, a veterinary inspector is empowered to require the slaughter of any horse presented for shipment which in his opinion is unfit to travel or work. Exemption from the veterinary examination and certificate is allowed in the case of horses shipped to any port outside Europe, as the high cost of freightage would preclude the shipment of unfit horses, and also in the cases of horses which are accompanied by a certificate of the Jockey Club that they are thoroughbreds and are being shipped for racing or breeding purposes. All other horses must be examined and certified as fit to travel and work, and they may only be exported from certain specified ports at which are stationed whole-time Inspectors of the Ministry. At one time allegations were made that the Orders of the Ministry were not being enforced with sufficient severity, and that decrepit horses unfit to travel or work were being exported. A considerable public agitation was aroused, though the principal ground of complaint was in regard to the treatment of the horses after their arrival on the Continent, on their way to and in the slaughterhouses. The Ministry could not be held responsible for the treatment of the horses in a foreign country, but so far as possible arrangements are made for the slaughter of the horses in this country, so that the foreign demand for horse flesh may be met by the export of carcases rather

than of live animals. At the same time the standard of fitness for export has been raised and at the present time it is higher than that required for a working horse in this country. The result is that any reasonable ground for complaint of the trade has been removed, except on the part of those who object to any horse being slaughtered for human consumption.

Chapter VI

THE TEACHING OF AGRICULTURE

THE Act constituting the Board of Agriculture in 1889 authorised the Board to inspect and aid any schools, other than public elementary schools, in which practical or scientific instruction in agriculture was given. But the extent of the assistance which could be given was limited to a sum of £5,000 a year for the whole of Great Britain, which had been placed in the previous year at the disposal of the Agricultural Department of the Privy Council, and the administration of which was taken over by the Board.

At that time the only facilities for higher agricultural education were those provided at the Agricultural Colleges at Cirencester, Downton and Aspatria, which had been established by private enterprise, and the only encouragement given by the State to any form of agricultural education was by means of the grants given by the Science and Art Department in respect of scholars who passed an examination in the Principles of Agriculture, and by the establishment of a Lectureship in Agriculture at South Kensington to provide courses of instruction for teachers. The examinations of the Science and Art Department were unrelated to practical agriculture, and the schools concerned entered candidates more with the object of earning the grant

than with the idea of fitting them for their vocation in life.

The Board of Agriculture began its efforts to build up a suitable system of Agricultural Education in a very modest fashion. The Parliamentary grant of £5,000 a year was distributed with a cautious and sparing hand, and in the first year only £1,630 was actually spent, mainly in small grants to existing institutions, such as dairy schools. The first college to receive a grant was the University College of North Wales at Bangor, which had just added an agricultural department to its existing organisation, and was the first example of the policy of linking up higher agricultural education with the general education provided by the Universities of the country.

The opportunity of developing agricultural instruction on a wider scale through the county authorities arose in a curiously haphazard way in 1890. In that year the Government imposed additional duties on beer and spirits, with the intention of using the proceeds, partly in grants to the Local Authorities for police purposes, and partly for the extinguishment with compensation of liquor licences. The licensing proposals aroused such opposition that they had to be withdrawn, and other purposes had to be found for what became known as the whisky money amounting to £750,000 a year. It was decided to pay it into the Local Taxation Account for distribution to the County Councils, who were authorised to use it for technical, including agricultural, instruction. No obligation was placed on the Councils to do so, and in some Counties it was

regarded as a windfall and applied in reduction of the rates. But in other Counties it was used to establish local lectures, itinerant instruction, dairy schools, etc., as well as in grants to existing or new Agricultural Colleges. The amount so applied to agricultural instruction in England and Wales out of the whisky money varied from £80,000 to £90,000 a year, but it was very unevenly distributed throughout the country. Some Counties spent nothing, others only £300 a year, while some spent as much as £15,000. In the main the agricultural Counties spent least, for at that time the farming community was far from convinced of the value of a scientific education in agriculture.

From 1890 onwards the Board of Agriculture applied its limited funds principally in grants to institutions of a central character, leaving Local Authorities to deal with the more local forms of instruction. It was the object of the Board to secure the establishment of a sufficient number of centres for higher agricultural education, associated where possible with a University, and so placed as to cover the whole country as evenly as possible.

This aim was steadily developed in succeeding years. In 1890 the Yorkshire College at Leeds and in 1892 the College of Science (now Armstrong College) at Newcastle and the University College at Aberystwyth established agricultural departments, and Cambridge University instituted a diploma in agriculture. Similar action was taken in 1894 at the University College, Nottingham, and the University Extension College at Reading, and in 1896 the Agricultural College at Wye was founded and

associated with the University of London. All of these centres received grants from the Board of Agriculture, usually of £800 a year, and in 1896 the total amount distributed was £6,950. In that year the first experimental farm was established by the Northumberland County Council at Cockle Park and placed under the control of the agricultural department at Armstrong College, and an additional grant of £200 a year was given by the Board in respect of it.

In 1899 the Midland Dairy Institute was established by the County Councils of Derby, Leicester and Nottingham, and the year was also notable for the establishment of a Professorship of Agriculture at Cambridge by the generosity of Sir Walter Gilbey and the Drapers Company, aided by a grant from the Board of Agriculture.

In 1902 five more institutions were added to the list of grant-aided centres. They were the Holmes Chapel College in Cheshire, the Uckfield College in Sussex, the Cumberland and Westmorland Farm School at Newton Rigg, the Harris Institute at Preston and the Harper Adams College in Shropshire. In 1903 the Fruit and Cider Institute at Long Ashton, and in 1905 the Farm Schools at Ridgmont in Bedfordshire and at Basing in Hampshire were established and given grants by the Board.

In 1906 an additional kind of agricultural education was aided by a grant of £800 to the Royal Veterinary College at Camden Town and in that year the total grants made by the Board had increased to £11,550 a year.

By this time therefore a number of teaching

institutions of varying kind had been established throughout the country, but they were somewhat unevenly distributed, they had grown up without any considered scheme of organisation, they were inadequately provided with accommodation and equipment, and the staff was insufficient and badly paid.

Accordingly in 1908 a strong Committee under the chairmanship of Lord Reay, was appointed by the President of the Board (Lord Carrington) to inquire into the provision for scientific and technical instruction, and to report whether the existing facilities were satisfactory and sufficient, and, if not, how they might be modified and extended. The Report of this Committee laid the foundation of all the subsequent developments. It indicated that the institutions for higher agricultural education were sufficient in number, but that better equipment and staff were required. On the other hand the Committee reported that the facilities for agricultural instruction of a lower grade were unorganised, unsystematic and wholly inadequate, and it recommended the establishment of Farm Institutes providing winter courses for lads of from 17 to 20, who had already gained some practical experience of agriculture. It expressed the opinion that in the course of the next ten years from 50 to 60 of these schools should be established in England and Wales. The Institutes should also be the headquarters of the County staff of agricultural instructors, and should be provided with farms for practical instruction and experiments. The Committee recommended that largely increased funds

should be provided, mainly from the Exchequer, and that the Board of Agriculture should not only assist the Agricultural Colleges, but also aid the Local Authorities to develop and extend the county staffs of instructors, etc., and the organisation of local work.

The opportunity for carrying out the principal recommendations of the Reay Committee came with the establishment in 1910 of the Development Commissioners, who were entrusted with the distribution of a sum of £2,900,000 for the development of agriculture, forestry, inland navigation, harbours and fisheries. The Commissioners set aside a sum of £325,000 for the development of Farm Institutes, under conditions which enabled the Board of Agriculture to make grants to County Councils of 75 per cent. of the capital cost of providing an Institute, and up to 50 per cent. of the annual cost of maintenance. It was, however, considered desirable that in the first instance an adequate staff of county instructors should be provided, and that they should be at work in the county for at least a year prior to the foundation of an Institute. Schemes were approved for six Farm Institutes prior to the outbreak of the Great War in 1914, but the work of extending the facilities for agricultural education provided by County Councils was impeded to some extent by a stipulation that grants from the Development Fund could only be made in respect of new work. This meant that no development was possible unless the Local Authorities were themselves prepared to bear part of the cost, and those Local Authorities which were already

spending considerable sums on itinerant instruction were prejudiced in comparison with those which had hitherto done little or nothing. Various attempts were made to overcome this difficulty by the adoption of elaborate and complicated regulations, designed to give due weight to the existing expenditure of County Councils, but they proved so difficult to work that it was decided, after the War, to transfer the whole cost of the grants in aid of Agricultural Education, both to local authorities and to agricultural Colleges, from the Development Fund to the Vote of the Ministry of Agriculture.

The Government agreed in 1919 that a sum of £2,000,000 should be placed at the disposal of the Ministry, spread over a period of five years, and a simplification of the system of grants was introduced. Additional funds became available in 1921 out of the sum of £1,000,000 which was provided for Agricultural Education and Research when the Corn Production Acts were repealed.

The increased funds thus made available have enabled the Ministry to assist in building up a fairly complete scheme of agricultural education throughout the country. The teaching of agriculture is provided for mainly by two agencies, viz. (1) the agricultural Colleges and agricultural Departments of Universities, and (2) the Agricultural Organisers and County staffs of County Councils, some of which have established Farm Institutes. Both those agencies have been assisted by liberal capital grants from the Ministry amounting to from 50 to 75 per cent. of the cost of the necessary

buildings and equipment, and the Ministry also contributes annually to the cost of maintenance to the extent of about £240,000 a year, of which £50,000 goes to the Colleges and £180,000 to the County Councils.

There are now eight University Colleges or Departments of Agriculture and six Agricultural Colleges engaged in the work of Higher Agricultural Education, which receive grants from the Ministry. Both the old Universities of Oxford and Cambridge have flourishing Schools of Agriculture, the University of Durham has an agricultural Department at the Armstrong College at Newcastle, London University has Wye College in Kent, the University of Wales has agricultural Departments at Bangor and Aberystwyth, and the Universities of Leeds and Reading have their agricultural Departments. In addition there are the Harper Adams College in Shropshire, the Midland College at Sutton Bonington in Notts, the Royal Agricultural College at Cirencester, the Seale Hayne College in Devon, the Swanley Horticultural College for Women at Swanley in Kent and the Royal Veterinary College in London.

Each of these University Departments and Colleges provides a course of instruction covering two or three years leading up to a degree or diploma. They are intended for young men or women of 17 or upwards who have received a good general education at a secondary school, and who propose to farm on their own account or to obtain posts as agricultural organisers, teachers or research workers. A recent census showed that while only one-third of the

students at the Colleges were the sons or daughters of farmers, two-thirds of them had practical farming as an objective. The remainder were about equally divided between those who contemplated teaching or other official work as their profession, and those who hoped to obtain posts as managers of farms or estates.

The maximum accommodation at all the Colleges and University Departments is about 2,200, but at the present time (1927) they are only about two-thirds full. About one-sixth of the students are women.

At the residential Colleges the inclusive charges for tuition and board vary from £120 to £150 a year. The fees for short winter courses of six months are from £12 to £20, with 25s. or 30s. a week in addition for board and lodging. In many cases scholarships given by the Local Authorities reduce the cost materially. The revenue of the Colleges, apart from fees, is derived in some cases from endowments and from contributions from the County Councils and also from the grants made by the Ministry. These grants, which vary in amount from £1,500 to £5,700 a year, are re-assessed at intervals of five years after an examination and inspection of the work of the Colleges by the Ministry.

The other main agency for agricultural education is the County Councils, who are responsible for all forms of it below that provided by the Colleges. It has already been mentioned that, prior to the War, some progress had been made, with the help of the Whisky money and of grants from the Development Fund, in securing a staff of County instructors and in

establishing a few Farm Institutes. Since the War, with the increased funds at its disposal, the Ministry has been able to secure a considerable development of this side of the work.

The Ministry has no power to force County Councils to make any provision for agricultural education. It can only exercise influence and encouragement by the offer of grants in aid, the amounts of which are based on estimates submitted by the Councils and approved by the Ministry. Primary importance is attached by the Ministry to the appointment of a competent agricultural organiser in each County to take general charge of the agricultural education of the County, to superintend the work of the other members of the County staff, and to act as the Principal of the Farm Institute, where there is one. In order to give special encouragement to the appointment of Agricultural Organisers, the Ministry pays four-fifths of their salaries and expenses. The remainder of the approved expenditure of the County Councils is aided by the Ministry to the extent of two-thirds, and capital grants are given of three-quarters of the cost of approved building schemes for the establishment of Farm Institutes.

The result of this assistance has been that, with two exceptions, every County Council in England and Wales receives grants from the Ministry. Lancashire spends considerable sums on agricultural education, but the County Council prefers to remain independent of help from the Ministry. The Soke of Peterborough, a very small County, incurs no expenditure aidable by the Ministry.

In fifty-three Counties Agricultural Organisers are at work, and they are assisted by instructors in agriculture, horticulture, dairying, poultry-keeping, bee-keeping, farriery, farm accounting, etc. The total number of whole time organisers and instructors employed by the County Councils is nearly 300, and there are also a number of part-time instructors in various subjects.

The organisers and instructors are occupied in visiting and advising the farmers, small holders, poultry keepers, etc., in the county, organising day and evening classes, giving lectures and instruction in manual processes, arranging demonstrations and superintending experiments, as well as being responsible for the courses of instruction and the conduct of the farm at the Farm Institute, where one has been established. By these means a considerable proportion of the agriculturists in a County can be reached and influenced, and it is impossible to exaggerate the effect which a good Agricultural Organiser, who has gained the confidence of the farmers, can have in raising the standard of farming, in applying the lessons of scientific research and in stimulating progress and enterprise.

Unfortunately this kind of work takes time and needs an adequate staff in every County. While some Counties are well provided for, in others the facilities are still very inadequate. In the case of a service which is not compulsory, some unevenness and lack of uniformity is inevitable. The fact that some Counties spend as much as £15,000 a year on agricultural education, while the expenditure of others, ^{equally important from the agricultural point}

of view, does not amount to more than £300 a year, has led some authorities to advocate the transfer of the responsibility for agricultural education from the County Councils to the Agricultural Colleges or to the Ministry, and the assumption of the whole burden of the cost by the National Exchequer.

It is doubtful however whether any such change would be wise, even if it was politically possible. Local Authorities and their constituents in the farming community are becoming increasingly convinced of the value of education, and any change which would substitute a bureaucratic for a democratic system would be intensely unpopular. Uniformity would be too dearly purchased if it involved the loss of the enthusiasm, civic pride and local knowledge of the members of Local Authorities. One of the greatest assets in our system of local government is the extent to which men and women are prepared to render unpaid service in the affairs of their neighbourhood, and this could never be effectively replaced by the work of officials of the central Government however zealous and efficient.

On the whole the Ministry has no cause to be dissatisfied with the progress made. In addition to the staff of County organisers and instructors which has been established, there are now seventeen Farm Institutes at work. These Farm Institutes are intended to provide short courses of instruction for farmers' sons and their wives and daughters, to serve as the headquarters of the County staff, and as a centre for demonstrations and experiments on the Institute farm for the information of the farmers of the County as well as the students of the Institute.

In addition to the farms attached to the Farm Institutes, several County Councils have established Demonstration Farms, some of which are run as dairy holdings and some as mixed farms. On these farms experiments are conducted in the improvement of grass land, the feeding and management of live stock, arable dairying, milk records, manurial trials for cereals and root crops and other subjects, and the farmers of the counties are encouraged to visit the farms and see the scheme of work and the results. Altogether the total area in England and Wales held and managed by the County Councils as Experimental and Demonstration Farms is over 6,000 acres, and some 600 separate experiments are being conducted on uniform lines.

Between 800 and 900 students receive instruction every year in the Farm Institutes, the day and evening classes of the County organisers and instructors are attended by over 10,000 persons each year, and from 8,000 to 10,000 individual lectures and demonstrations are given annually. In some Counties excellent work is being done by the formation of Agricultural Discussion Societies at which farmers meet and discuss their problems with members of the County staff or other special experts. The total annual expenditure of the County Councils on agricultural instruction is approximately £250,000 a year, of which the Ministry defrays about 68 per cent.

Scholarships

Part of the expenditure of County Councils is incurred in respect of scholarships given to enable

students from the County to attend the Agricultural Colleges or Farm Institutes at reduced fees. The Ministry also has two separate schemes of scholarships.

The most important is that which was established in 1922 for the benefit of the sons and daughters of agricultural workmen and others in comparable financial circumstances. It arose out of the new fund of £1,000,000 for agricultural development which was provided under the Corn Production Acts (Repeal) Act, 1921, as part compensation for the withdrawal of the subsidy on wheat and oats and the abolition of the Agricultural Wages Board. It was felt that some part of the fund should be definitely allocated for the benefit of the workers on the land and their families, and accordingly a scholarship scheme was established for the purpose.

The Scholarships offered are of three classes. The first class is for three years tenable at University Departments of Agriculture for degree courses in agriculture or horticulture, with an extension for a fourth year in suitable cases. The second class is for two years tenable at a University Department or Agricultural College for a diploma course in agriculture, horticulture, dairying or poultry keeping. Class III Scholarships are for short courses not exceeding one year tenable at a Farm Institute.

The Scholarships are intended to meet the whole course of education, including maintenance and outfit. The maximum allowance for Class I is £150 a year or £200 a year in the case of students sent to Oxford or Cambridge, with an outfit allowance of £50. Class II Scholarships carry a maximum allow-

ance of £200 for the first year and £150 for the second year and Class III scholars receive personal allowances up to £15 for the first term and £10 for each subsequent term. In addition, the Ministry pays the tuition fees for all the scholarship holders and the cost of board, residence and laundry of the Class III scholars.

The other Scholarship scheme maintained by the Ministry is for the purpose of training post-graduate students who intend to take up a career as an Agricultural Organiser or a lecturer in an Agricultural College. A small number of scholarships for two years are awarded to men who have already taken their degrees in agriculture, to enable them to spend one year at such a centre in this country as the Institute for Research in Agricultural Economics at Oxford, and the second year in the United States or one of the Dominions. The scholarships are of the value of £200 a year together with fees and travelling expenses, and for the second year an additional allowance of £150 is made to cover the extra cost of living in the United States.

Chapter VII

AGRICULTURAL RESEARCH

THE problem of adjusting the supply of food to the requirements of the increasing population of the world is one of vital importance and interest. Whether the pressure will become acute or not must depend largely on the extent to which the production of food can be intensified, and this again is dependent on the discoveries of science and their application in practice. It is generally recognised, therefore, that the resources of the State should be used to encourage and assist research in agricultural science, and that no form of expenditure offers greater possibilities of fruitful results.

As soon, therefore, as the Development Fund was established in 1910, the Ministry applied for a grant in aid of scientific research in agriculture. After consultation with the Development Commissioners a complete scheme was drawn up and approved in 1911, which has been gradually carried out and developed as funds permitted until the whole ground has been covered.

The basis of the scheme is the organisation of research by subjects. The study of each of the main problems of agricultural science is allotted to a Research Institute, the staff of which can devote themselves as a team to work on the particular problem or group of problems allotted to them. As

far as possible the Research Institutes have been linked to Universities, but the staff of the Institutes are not burdened with teaching work, and they are not responsible for the demonstration of the results of research in the form of field trials such as are conducted on the farms attached to the Agricultural Colleges or Farm Institutes. The object and purpose of the Research Institutes is the investigation and ascertainment of fundamental principles, subject to the general condition that the programme of work has a distinct bearing on the problems of agriculture. Within these wide limits the research worker is free and untrammelled : he may be described as engaged in industrial science, but he can still preserve the highest ideal of adding to the sum of knowledge for its own sake. It is probable that all discoveries will have their practical application in one form or another, but scientific research is not primarily concerned with economic results.

The field of Agricultural Research has been divided up into twelve main subjects, and the investigation of these subjects has been allotted to twice as many Institutes. The investigation of soil problems and plant nutrition and also of plant pathology has been undertaken by Rothamsted : soil problems are also studied at the Aberdeen and North of Scotland College of Agriculture. Animal Nutrition is dealt with at Cambridge and at the Rowett Institute, Aberdeen ; Animal Breeding at Edinburgh and at Cambridge ; Animal Pathology at Cambridge and at the Royal Veterinary College in London as well as at the Ministry's Veterinary Laboratory at Addlestone (which is not in the strict

sense an independent Research Institute), and by the Animal Diseases Research Association in Scotland. Plant Breeding has been allotted to Cambridge, with special reference to Cereals, and to Aberystwyth, with special reference to Grasses and Forage Crops: the breeding of Oats and Grasses and also Potatoes, Swedes and Turnips, is studied at the Edinburgh Plant Breeding Station: Plant physiology is dealt with at the Imperial College of Science in London, and Agricultural Parasitology at the London School of Hygiene. Horticultural problems are investigated at Long Ashton, Bristol, at Cambridge, at East Malling in Kent and at Cheshunt in Herts. Dairying is dealt with at Reading, and Agricultural Economics and Agricultural Engineering at Oxford. In addition to these Institutes for scientific research, the National Institute of Agricultural Botany has been established at Cambridge for the purpose of developing and placing on the market new strains of seeds which may be produced by the work of the Plant Breeding Institutes. The Rowett Institute, the Edinburgh Animal Breeding Institute, the Edinburgh Plant Breeding Station and the Animal Diseases Research Association are assisted by the Board of Agriculture for Scotland: the Ministry of Agriculture is responsible for the other Research Institutes. The grants made by the two Departments for the establishment and maintenance of the Research Institutes are drawn from the Development Fund, and the work as a whole is co-ordinated by a Research Council consisting of the Directors and some representatives of the staffs of the Institutes, together with representatives of the Ministry, the Board of Agriculture for

Scotland, the Development Commissioners, and the Department of Scientific and Industrial Research. Through this Research Council the several Research Institutes are kept in contact, common action is secured and unnecessary overlapping avoided. The Council discusses administrative questions and other matters of common interest, and from time to time sets on foot investigations which require the combined work of more than one Institute or the assistance of the Agricultural Colleges or other educational or experimental centres.

The Research Institutes are not Government institutions, though in many cases their establishment has been due to the initiative of the Ministry, which has provided a large proportion of the cost of their buildings, land and equipment. For the most part they are departments of Universities, and in all cases they are under the control either of the University authorities or of an independent governing Body. The Ministry does not attempt to control their internal administration, and its function is confined to the distribution of grants for the purpose of enabling them to carry out approved schemes of research submitted by the Institutes themselves, but sometimes suggested by the Ministry. In point of fact the greater part of the cost of annual maintenance is defrayed by the grants from the Ministry, though in some cases the Institutes have endowments of their own or obtain contributions from private sources.

Similarly the workers in the Research Institutes are in no sense Civil Servants. They are free to do their work and publish the results without inter-

ference from the Ministry and without committing the Government to any responsibility for their action. The Ministry can withdraw or reduce its grant if it is not satisfied with the work carried on, but apart from this the Institutes and their staffs are free to pursue their investigations on their own lines. It is believed that this system provides the most favourable conditions for carrying on scientific research.

The establishment of the Research Institutes had, in some cases, to be postponed until a sufficient supply of research workers was available. The prospect of finding a career in agricultural research in this country, prior to the establishment of the Development Fund in 1910, was so poor that any scientific students who desired to adopt it had as a rule to find posts in other parts of the Empire. The Ministry, therefore, in co-operation with the Development Commissioners, instituted a system of scholarships to provide a supply of well-trained investigators. The scholars were selected from men or women who showed high promise as undergraduates, and they were required to undertake a course of study extending over three years in research laboratories at home and abroad.

On the outbreak of War in 1914, thirty-five scholars were in training, of whom nine were in Germany, seven of whom succeeded in escaping. The other two were interned at Ruhleben, where they gave lectures and established a Biological Laboratory in a corner of a disused hayloft. Six of the scholars have died or were killed in the War, and of the others, so far as is at present known,

twenty-five are engaged in agricultural research work or in teaching in this country, and four are doing similar work abroad.

After the War, the Ministry awarded a number of research exhibitions for one year to ex-service men whose research work had been interrupted by the War, and the pre-war system of scholarships for three years has been revived. From six to eight scholarships of the value of £200 a year are granted each year, and the awards are made on the recommendation of the Development Commission's Advisory Committee on Agricultural Science, which includes representatives of the English and Scottish Departments of Agriculture, the Directors of some of the principal Research Institutes, and certain independent men of Science.

The Ministry has also made provision for the grant of Travelling Fellowships to enable workers at Research Institutes to visit foreign research laboratories and study their methods and work, and to attend international congresses of importance.

It was not only necessary to provide recruits for agricultural research work by the offer of scholarships, etc., but also to provide those who joined the staff of a Research Institute with an assured career and reasonable prospects of continuous employment at fair salaries. The Ministry has therefore provided for uniform grades with uniform scales of salary common to all the Research Institutes in England and Wales. The senior grades can rely on the same measure of permanence as that of a Professor or Reader at a University. Like University teachers, the scientific and administrative members of the

staffs of Research Institutes become members of a contributory superannuation scheme which will provide moderate pensions on retirement.

Advisory Service

One of the most important problems is to secure that the results of the work of the Research Institutes are applied in practice, and that new scientific discoveries are brought to the knowledge of farmers throughout the country. With this object the Advisory Service has been established to form a link between the Research Institutes on the one hand and the Agricultural Departments and Colleges and the County staffs on the other, and to provide a number of specialist officers who can advise farmers and carry out local investigations. The advisory officers are attached to a University or College, but their salaries are, with very rare exceptions, wholly paid by the Ministry, and they are not expected to do more than a very limited amount of teaching. They move about freely among the farmers in their area, ascertain their difficulties, investigate their problems and give them advice. In these activities they work in co-operation with the County Organisers, who seek their assistance in matters of difficulty.

Fourteen advisory Centres have been established in England and Wales, including the Universities of Oxford, Cambridge, Bristol, Leeds, Reading and Manchester, the three University Colleges in Wales, and the Harper Adams, Midland, Seale Hayne, Wye and Armstrong Colleges. Sixty-four Advisory officers are now employed in Chemistry, Entomology,

Mycology, Dairy Bacteriology, Economics and Veterinary Science.

Special Research Grants

Provision is made in the research scheme for special grants to investigators elsewhere than at Research Institutes, or for specific lines of research outside the normal scope of an Institute's work. The grants are made on the recommendation of the Advisory Committee on Agricultural Science to individual workers at approved institutions providing suitable facilities. A considerable proportion of the special grants are made to workers at the advisory centres. They are made in the first instance for one year only, but may be renewed if a satisfactory report is received. If, however, it appears that a considerable period is required for an investigation which is considered to be of importance, arrangements are made for its inclusion in the regular programme of a Research Institute. The establishment of the Institute of Agricultural Parasitology at the London School of Hygiene arose out of a grant for a special piece of research into losses due to parasitic worms in animals and plants ; and, as a result of work on Silver Leaf done with the help of a special research grant, the Silver Leaf Investigation Station at Cambridge has been established to carry out a continuous study of the problem.

Cost of the Research Scheme

Capital grants amounting to £360,000 have been made by the Ministry out of the Development Fund for the establishment of the Research Institutes.

The grants have been mainly in respect of land, buildings and equipment, but £30,000 was provided in a capital sum for the permanent endowment of a Professorship in Animal Pathology at Cambridge. In a number of cases additional contributions have been obtained from private sources by the institutions concerned.

The cost of maintenance of the Institutes is almost entirely met out of the Ministry's grants, as is also the cost of the Advisory Service, the Research scholarships and the Special Research grants. The annual charge on public funds for these purposes is approximately £300,000 a year, of which about £200,000 goes in grants to the Research Institutes and £60,000 for the salaries and expenses of the Advisory Officers.

Work of the Research Institutes

It is impossible within the scope of this book to give any full account of the investigations which are being carried out by the Research Institutes. Those who are specially interested in the subject will find an admirable account in "Research and the Land," by Mr. V. E. Wilkins, which is published by the Stationery Office, price 2s. 6d. It may be useful, however, to state shortly some of the most important and interesting subjects of research which have been or are being undertaken by the Research Institutes.

Soil Problems and Plant Pathology at Rothamsted

The Experimental Station of Rothamsted at Harpenden is the oldest and most famous centre for Agricultural Research in the Empire. Its founder,

Sir John Bennet Lawes, Bart. (1814-1900), inherited the small family property of Rothamsted as a young man, and in 1837 he began experiments in pots with agricultural plants. He discovered that mineral phosphates treated with sulphuric acid produced a valuable fertiliser, and in 1842 he took out a patent for superphosphate and began its manufacture on a commercial scale. In the following year he secured the services of Sir Joseph Henry Gilbert (1817-1901), a trained chemist, who had studied under Liebig, and Lawes and Gilbert began the long series of experiments on soil problems, which have been continued ever since. The introduction of superphosphate was not only of the greatest possible value to agriculture but it proved highly profitable to Lawes. In 1872 he sold his manure business for £300,000, and set aside £100,000 as a permanent endowment of the Rothamsted experiments. The famous Broad Balk field of eleven acres, divided into half acre plots, has been used continuously for over eighty years for the growing of wheat, each plot receiving the same manurial treatment throughout the period. By this means records of a unique character have been compiled which have thrown new light on the problem of how the wheat plant grows and have revolutionised the system of manuring.

When the Development Fund was established in 1910, the scientific staff at Rothamsted consisted of a Director and four trained workers, and the available land, consisting of sixty acres, was practically all taken up for permanent experiments. Since then grants from the Development Fund have provided new buildings and laboratories, the farm has been

increased to 300 acres, and the staff includes some thirty university graduates besides voluntary workers, assistants and outdoor workers.

The research work at Rothamsted is directed to investigating the conditions under which the plant grows and draws nutriment from the soil, and it deals also with plant diseases and pests. Problems of manuring have always been an important part of the Rothamsted work, and in recent years an interesting development has been the discovery of the means of producing farmyard manure without animals. An investigation of the bacteria in straw and in cellulose led to the discovery of organisms which produced decomposition if they were supplied with nitrogenous food. Experiments were made with sulphate of ammonia, neutralised by the use of chalk to get rid of the injurious effect of the sulphuric acid, but this method was not entirely satisfactory. Eventually, however, a re-agent was found which was successful in bringing about the rapid rotting of straw and other plant residues, and three preparations have been devised for different classes of materials. These have been placed on the market by a Company formed by the public spirit of Lord Elveden, the profits of which are applied to further scientific work. The products of the Company are known as Adco manures, and the principles are being applied to products all over the world. The discovery is one which is proving of great value, not only for increasing the supplies of farmyard manure, but also in semi-tropical countries by converting jungle and veldt grasses, which had previously been of little or no value, into excellent manure for crops of all kinds. In

old days farmers put their faith in muck, and were inclined to decry chemical fertilisers. They were not altogether wrong, for no artificial fertiliser can entirely replace farmyard manure, which has a unique value of its own. But now the chemist has shown the farmer how to increase the supply of farmyard manure by artificial means.

Another problem which is the subject of investigation at Rothamsted is the study of the living organisms of the soil, which play a large part in the feeding of the growing plant. This involves the intensive study and classification of an immense number of minute organisms, and is an example of the patient detailed and continuous work involved in scientific research. For a whole year five trained scientific workers were engaged, Sundays as well as week-days, in a census of soil insects, counting day by day the numbers of bacteria and of nineteen different kinds of protozoa contained in Rothamsted soil. On another occasion eight research workers were engaged for a period of four days and nights, throughout the whole twenty-four hours, in taking samples from the soil every two hours, counting the number of bacteria and ascertaining the quantity of nitrates. This kind of research, which might seem to have little practical application, has led to work which may have an important bearing on the extension of the area of lucerne in this country. Lucerne is a valuable fodder crop and also increases the fertility of the soil, but though it was introduced into this country some 300 years ago it has not made much headway, except in the south-eastern and eastern counties. In other parts of the country farmers

who have tried it failed to get good crops, and it has been found that this was due to the absence from the soil of a special type of nitrogen-collecting bacterium which is essential to the growth of a vigorous crop. The Rothamsted research has resulted in the preparation of a culture which when put into milk with the addition of phosphate can be used to inoculate the seed. Trials have been carried out with inoculated seed at over fifty centres in Great Britain, and in some cases increases of crop of over 100 per cent. have been obtained.

Research work in plant pathology has also been centred at Rothamsted, where it is carried on in close collaboration with the Ministry's own Pathological Laboratory, which is housed at Harpenden quite near to the Research Station. The staff of the Pathological Laboratory are primarily engaged in advising the Ministry as to the administration of the Destructive Insects and Pests Acts, but they and the entomologists and mycologists at Rothamsted undertake research work into the histories and habits of insects and fungi, which have been estimated to damage the crops of this country to the extent of at least £15,000,000 a year.

Plant Physiology

The Imperial College of Science in London is responsible for research in plant physiology, which is the study of the life processes of plants. In no subject is there more need for fundamental research. We know little of the real reason why one variety crops more heavily than another, why one plant is susceptible to disease and another is not or what is

happening within the plant during its life. Just as human physiology is the basis of medical treatment, so a study of plant physiology is essential to successful agriculture. It is on the researches of the plant physiologist that much of the work of the plant breeder and the control of disease are dependent.

Much of the work at the Imperial College is carried on in the laboratory, but the research workers make use of the facilities for field investigations at Rothamsted, East Malling and Cheshunt, and frequently spend considerable periods at those Institutes.

One of the problems to which special attention has been paid is the effect of the application of electricity to crops by applying an electrical discharge to growing crops. It has been shown by a long series of experiments that electrification will stimulate growth, but more work is necessary before it can be recommended as a practical and economic proposition. The experiments involve the keeping of careful and detailed records of the voltage supplied, and of the periods and time of day during which the discharge is applied, and separate experiments have to be carried out for each kind of crop.

Plant Breeding

The object of the Plant Breeding Institutes at Cambridge and Aberystwyth is to increase the quality and output of farm produce by the production of improved varieties of crops. The plant breeder endeavours to produce a single variety which possesses all the good points of the different varieties already in existence. Most of the advance in recent years in the science of breeding, both of plants and

animals, is traceable to the investigations of an Austrian monk, Gregor Mendel, who in 1865 read a paper to the Brunn Natural History Society describing his experiments in the cross breeding of varieties of peas and enunciating theories as to the manner in which characters are inherited. Mendel's paper lay dormant until 1900, when de Vries, Correns and Tschermak independently unearthed the work through a casual mention in Focke's *Pflanzenmischlinge*. They confirmed it experimentally, and it then won immediate and universal acceptance. In this country the most distinguished early exponent was the late Dr. William Bateson, but Mendel's discoveries have been the foundation of all work in genetics which has subsequently been done either in Britain or abroad.

The principal problem which has been dealt with at Cambridge was that of breeding a wheat which combined the cropping qualities of the common varieties of English wheat with the baking strength of the best Canadian wheat. English wheats were deficient in strength and therefore fetched low prices from the miller, and Canadian wheats grown in this country were poor croppers and were therefore unacceptable to the farmers. Working on Mendelian principles, Sir Rowland Biffen, the Director of the Institute, has produced Yeoman Wheat, which is now being grown with success in many parts of the country, and whose milling quality is comparable to that of the best Canadian wheats. Yields of as much as ninety-six bushels to the acre have been obtained from Yeoman wheat.

The Cambridge Institute specialises in the breeding

of cereals, and is studying the chemical composition of barleys with a view to producing types of seed of improved malting quality, and is endeavouring to produce an improved type of winter oat, which is badly needed.

The Plant Breeding Institute at Aberystwyth gives special attention to the breeding of improved strains of grasses and clovers. This has involved the collection, classification and study of an enormous number of different varieties: in round numbers 62,000 individual grass plants and 32,000 clover and lucerne plants are being investigated. Grass breeding work is particularly complicated owing to the fact that the grasses grow in association and in competition with one another, and that their growth is constantly being affected by cutting or grazing. Moreover the technique of crossing is different from that applicable to cereals and special methods have had to be devised. The work is of first class importance in view of the large area of indifferent pasture in this country, and it has an important bearing on the experiments in grass-land improvement which are being carried out by the Ministry through the Agricultural Colleges and the County Organisers.

Animal Nutrition

The Cambridge School of Agriculture has been specially identified with this important subject. There is no direction in which fundamental research may be of more practical value if it is able to indicate economies in the cost of feeding animals and cheapen the cost of the production of meat. By means of a large number of experiments and the study of a

mass of statistical records, the Cambridge workers have aimed at ascertaining scientifically the quantity and character of the food required to produce given increases of weight per day. All feeding stuffs in use have been arranged in terms of their starch equivalent, which is a correct measure of their food value to the animal, and the maintenance requirements of animals have been studied to arrive at the quantity of food required to keep them alive. For experimental purposes, an instrument known as a calorimeter has been constructed, into which an animal is put, and which measures the heat given off by the animal. By this means its energy requirement can be calculated, which gives a basis for determining the amount of food it requires.

The Cambridge Institute also carries out extensive inquiries into the nutritive value of feeding stuffs, and analyses and digestive trials of grass are being made. This kind of inquiry involves much more than mere chemical analysis. Each kind of food has to be fed to animals kept under strictly controlled conditions in specially constructed apparatus, so devised that an accurate record can be kept of the value of the food to the animals and the use they make of it. Before much research work can be put in hand, and long before any results can be stated, it is often necessary to spend a great deal of time in devising suitable apparatus and methods by which an experiment can be carried out. The Rowett Research Institute has brought into prominence the importance of the mineral constituents in feeding stuffs. It has thrown a new light on animal nutrition and disease, and has opened up practical possibilities

of very great importance. The ramifications of a study such as this are immense, and much work remains to be done: but of the significance of the results achieved there appears to be no doubt.

Animal Breeding

The Animal Breeding Research Department of Edinburgh University is responsible for the investigation of breeding problems in regard to the larger farm animals, though much valuable work is also being done by the physiological staff of the Cambridge Animal Nutrition Institute. The work on these problems is highly technical, and while it has great possibilities of practical value it is hardly appropriate to a book intended for the general reader. There is however at Cambridge, a special Institute dealing with the breeding of small animals, some of whose work is of particular interest. One of the problems of the poultry keeper is that he usually hatches far more cockerels than he needs. He cannot however distinguish the sex of his chicks at birth or for some time afterwards, and he is therefore put to the unnecessary expense of feeding and rearing a number of chicks which he does not want if they turn out to be cockerels. It was discovered that the factor which determines the colour in the down of a chick is linked with the sex factor, so that if a "silver" hen, such as a Light Sussex, is crossed with a "gold" cock, such as a Buff Orpington, all her sons are "silver" and all her daughters "gold." This is shown by the down of the new hatched chicks, the cockerels being creamy yellow and the

pullets golden brown. If this kind of mating is adopted therefore the breeder can kill off all his unwanted cockerels at hatching, and rear double the number of pullets with the same plant.

Animal Pathology

The research work in this subject, which is being carried on at Cambridge, at the Royal Veterinary College and at the Ministry's Veterinary Laboratory at Addlestone, has already been described in the chapter dealing with Animal Diseases (page 77).

Agricultural Parasitology

The London School of Hygiene is responsible for research in this subject, and for experimental work the Institute has been provided by the Ministry with a field station and a small farm near St. Albans. Great damage is done both to plants and animals, including poultry, by various parasitic worms, and it is the function of the Institute to investigate the life history and habits of the various species. Material for investigation is obtained from, among other sources, the Metropolitan Meat Market, from the Zoo and from an abattoir at Aberystwyth, and in regard to plant infestation a special investigation is being made into eelworms, which cause damage to oats, potatoes, clover, etc. A careful study of the life history of the parasites is necessary in view of the lack of scientific knowledge on the subject, and it is an essential preliminary to the work of the animal or plant pathologist in advising remedial measures against the diseases caused by them.

Dairying

Research work in dairying is carried on at the Dairy Institute at Reading, which has been provided with a farm of 350 acres at Shinfield. The Institute has concentrated on a study of the conditions under which clean milk can be produced on ordinary farms without any undue expenditure on new buildings or apparatus. The work is therefore of great importance not only to the farmer but to the general body of consumers, and is of vital value from the public health point of view. The Institute has shown that on a farm very indifferently equipped it is possible to produce milk which obtained a licence as Grade A (Tuberculin Tested), and it has set an example to the numerous Clean Milk Demonstrations which are carried on all over the country. It is largely due to the work of the Dairy Institute that agricultural opinion is now so much more alive to the necessity of producing milk under clean conditions.

The Institute is also concerned with the feeding of dairy herds, the technical processes of cheese and butter making, breeding for milk production, investigation of the butter fat content of milk, the utilisation of whey and the feeding of pigs. It has shown that the addition of cod liver oil to the ration of dairy cows will bring up the deficiency of Vitamin A which may otherwise occur in milk during the winter.

Horticulture

Horticultural Research is divided up among a number of Institutes at Bristol, East Malling, Cheshunt and Cambridge. The Long Ashton Agricultural and Horticultural Research Station near

Bristol began its career as a centre for cider investigations, and its work in that direction has done much to secure the improvement in recent years of the quality of British Cider. The work of the Station now extends to all branches of Fruit Culture, Fruit Diseases and Pests, and Fruit Preservation, and its operations are collateral with those carried out at the East Malling Research Station in Kent.

One of the most important pieces of work undertaken by the two Stations, was the investigation and classification of root stocks. It was found that there was a vast array of stocks of different types, that good and bad types were constantly mixed up and that their names were interchangeable. A careful classification has been made, and order restored from what was a condition of chaos. The stocks have been grouped in classes suitable for different purposes, and it is common to find in the catalogues of nurserymen, references to the East Malling classification of stocks as an accepted standard. The influence of the root stock on the growth and production of the tree is so great that it is of primary importance to select stocks that can be depended upon.

Similar work is proceeding to sort out the varieties of bush fruit. There were found to be ninety-seven distinct sorts of raspberries among sixty-four named varieties, and the same name was found applied to eight distinct varieties, many of them differing absolutely in character.

In connection with Long Ashton, a Fruit and Vegetable Preservation Research Station exists at Chipping Campden. It is hoped that research into this problem may enable British fruit growers to

capture some part of the large trade in imported canned and bottled fruits and vegetables, which amounts in value to £9,000,000 a year, and at the same time give them an outlet in times of glut when more fruit is produced than the market can absorb in fresh form. As a result of the investigations of the station, a small canning machine has been devised and is on the market. The work in progress also covers such questions as the manufacture of jams, jellies and syrups.

Research work into the special problems of the glasshouse industry is carried on at the Nursery and Market Garden Crops Station at Cheshunt in Hertfordshire. As an example of the work in progress, mention may be made of a study of the Tomato moth, which was at one time causing losses of £50,000 a year to growers; this investigation has resulted in elaborating a successful and economical method by which the disease can be controlled, and a method of applying naphthalene vapour for the destruction of the red spider, which damages cucumbers, tomatoes and carnations, has been devised.

At Cambridge there has been since 1922 a Horticultural Research Station, to study the special fruit problems of the eastern counties. Its work is largely directed to improving the kinds of fruit trees and bushes, which involves raising them from seed and must necessarily therefore occupy many years before results can be expected. In the meantime, research is being conducted into sprays for use as insecticides and fungicides, and experimental trials are made in commercial plantations. The Institute is also testing a number of garden varieties

of apples and pears for their suitability for commercial growing. In conjunction with Bristol, a survey of the soil of fruit areas is being carried out to ascertain the soil conditions suitable for successful fruit growing.

An Investigation Station has also been established at Cambridge in connection with the School of Botany to study Silver Leaf Disease, in the hope of obtaining effective means of control of what is one of the serious enemies of the fruit grower.

Agricultural Engineering

The youngest Research Institute is that which was established in 1924 in connection with Oxford University for Research in Agricultural Engineering. There is great need for scientific research as to the basis of design of the implements and machinery used in agriculture, and the Oxford Institute links up the fundamental research into soil physics at Rothamsted, with the practical problems of the implement manufacturers. It is also of considerable assistance to the other Research Institutes in connection with the design and construction of special apparatus required for their investigations.

Among the special problems which the Institute is investigating is that of dehydration, or the artificial drying of crops and other materials. If anything could be done to overcome the vagaries of the British climate, and give the farmer assurance that he could harvest his crops in good condition whatever the weather, it would be of inestimable value, though the loss of his favourite grumble might cause a pang. But it is not only in regard to

ordinary farm crops, such as corn or hay, that efficient artificial drying would be valuable. Both in many industrial operations and in tropical agriculture the provision of a reliable dryer is badly needed. After numerous experiments, the Oxford Institute has designed a method of mass drying by hot air, which has been demonstrated in many parts of the country, and a machine has been placed on the market, which was awarded the medal of the Royal Agricultural Society at the Chester Show in 1925. It is perhaps too soon to say whether all the technical difficulties have been overcome or whether the process would be economic as applied to ordinary farm crops, but the Institute has gone a long way towards the solution of the problem and further investigation is still proceeding.

The Institute has also investigated the possibility of generating electricity by means of windmills, and a report has been published in which the cost per unit has been worked out in respect of nine different kinds of wind wheels which were tested for a whole year. In rural areas where no public supply of electricity is available, there are considerable possibilities of harnessing the wind to supply light and power.

Agricultural Economics

Oxford University is also the centre for research work on Agricultural Economics, but as the research on this subject is of a somewhat different character from the kind of scientific research carried on at the other Institutes, it has been dealt with separately in Chapter XII, which describes also the work of the Ministry itself on this most important subject.

National Institute of Agricultural Botany

The National Institute of Agricultural Botany at Cambridge is treated on the same lines as a Research Institute, but it is concerned not so much with original research as with the testing on a field scale of new and improved strains of seeds, and subsequently placing them on the market. The Institute forms therefore the link between the plant breeder and the grower. It was established in 1919 by means of subscriptions of £15,000 from the Seed Trade, £5,000 from the Milling Trade, over £22,000 from private donors and a grant from the Development Fund of £25,000. In 1922, Sir Rowland Biffen passed on to the Institute his new wheat Yeoman II. The Institute arranged to grow on this seed on its own farm and on private farms, where it was inspected and harvested under controlled conditions, and in 1924 it was able to dispose of 2,500 quarters to the seed trade, which was sufficient for the sowing of 10,000 acres. From this stage onwards the commercial exploitation of the seed will be undertaken by the seed trade, who will be responsible for seeing that the stock is kept pure. Any profits made by the Institute will be applied to the furtherance of its work or the development of plant breeding.

The Institute houses the Ministry's Official Seed Testing Station (see page 265), and it is also responsible for the Potato Testing Station at Ormskirk, where new stocks of potatoes which claim to be immune from Wart Disease are tested, to which further reference is made on page 175.

Chapter VIII

LIVE STOCK IMPROVEMENT

IT is often said that Britain is the stud farm for the whole world, and it is true that there is no country in which the breeding of pedigree live stock has been carried to greater perfection. But at the same time it is equally true that there is room for great improvement in the quality of the general run of the live stock on the farms of the country, and some of the most useful work of the Ministry in recent years has been directed to this end.

The principles upon which the improvement of the live stock of the country can be secured are fairly well-known, though there are still problems of breeding which require further research and investigation. What is needed is to apply on a much wider scale the principles which are already practised by the breeders of pedigree stock, and to grade up the commercial flocks and herds of the country to something like the level attained by the best breeders.

The establishment of the Development Fund in 1910 afforded to the Ministry the opportunity of undertaking this work, and a scheme was prepared with the object of inducing farmers to use only sound and high class sires, and to keep records of the milk yield of their dairy cows, in order to get rid of poor milkers and to improve by judicious

selection and breeding the productiveness of their herds. The scheme came into operation in 1914, and for the first five years was financed by grants from the Development Fund, but it has now been taken over by the Ministry as part of its normal work and the expenditure is met from the Ministry's own Vote.

Premium Sires

The scheme of the Ministry provides for assistance towards the purchase of high class sires for the use of groups of farmers. It is designed particularly for the benefit of the smaller farmers, whose herds are not large enough to justify the purchase of an expensive sire and who are too often tempted to make use of the services of an indifferent sire for which a very small service fee is charged. It is recognised that the best way of grading up the quality of ordinary stock is by the employment of good sires, and the Ministry's scheme places them at the disposal of farmers in all parts of the country at reasonable fees.

The Ministry makes grants to Societies of not less than ten farmers, or in certain cases to individuals, of part of the cost of a good sire, which shall be available for the use of the members of the Society or the neighbours of the individual owner at a reasonable fee.

In the case of Bulls, the Ministry's grant amounts to one-third of the purchase price of the Bull for the first five years, and one-fourth thereafter, subject to a maximum of £20. In the case of Boars, the grant is one-third of the purchase price subject to a

maximum of £5. Heavy Horse Societies are assisted by a grant of not more than £40 to hire a stallion at a fee not exceeding 300 guineas, and a grant not exceeding £40 to provide assisted nominations for small farmers who cannot afford to pay the ordinary service fees. A small number of grants are also made in Wales to encourage the improvement of Welsh Mountain Sheep. These grants are at the rate of 3s. 4d. per ewe served up to a maximum of £10.

The service fees charged for the premium bulls and boars vary from 2s. 6d. to 10s., and average about 5s. For heavy horses the service fee must not exceed £3 3s. 0d., which may be reduced to one half by an assisted nomination.

Since the establishment of the scheme in 1914, considerable progress has been made and valuable results attained. At the present time (1927) 1,400 bulls, over 900 boars and 100 heavy horse stallions are placed out under the Ministry's scheme, and the experience which farmers have gained after using these premium sires has afforded convincing proof of their value. At Agricultural Shows in different parts of the country the premium sires and their progeny have won numerous prizes, and although the number of premium sires is necessarily only a small proportion of the total number of sires in the country, the scheme has had a marked educational effect, and has convinced a large number of farmers that it is to their economic advantage to use a better class of sire. Abundant evidence is available that the advent of a premium sire under the Ministry's scheme is followed by the purchase of an increased

number of pedigree sires by neighbouring farmers on their own account.

The selection of the sires entitled to grants under the Ministry's scheme is subject to the approval of the Live Stock officers of the Ministry, and in many cases they actually select and purchase the bulls and boars on behalf of the Societies. The most popular breeds are the Shorthorn in the case of bulls and the Large Whites in the case of boars.

Milk Recording

The grading up of the Dairy Cows of the country can be greatly assisted by the adoption of the practice of systematic recording of the milk yield of cows. Milk recording was first adopted in this country about 1880 in the case of certain Jersey herds, but in the first instance the records were mainly concerned with the value and weight of the butter made rather than with the quantity of milk. Later on, prizes were given by the Jersey Society, by Lord Rothschild and by the Royal Agricultural Society for milk yield, which encouraged the keeping of milk records, but they were mainly confined to pedigree cows, and the practice was not adopted to any material extent in the ordinary commercial herds of the country.

The Ministry decided therefore, as part of the Live Stock Improvement Scheme, to encourage the foundation of Milk Recording Societies, the members of which undertake to weigh the milk of each of their cows at least one evening and the following morning every week. The Societies employ a Recorder, who pays surprise visits, to each herd at

intervals of not more than six weeks, to check the records taken. Each Society must consist of at least ten members owning between them at least 100 cows. The assistance given by the Ministry takes the form of a grant of £3 10s. od. per herd for the first two years, and £3 per herd in subsequent years, subject to a maximum of one-half of the total annual expenses of the Society. The members pay subscriptions based on the number of their cows, and these receipts together with the Ministry's grant defray the salary, etc., of the Recorder and the other expenses of the Society. At the present time the average annual cost per cow to the members of Societies is just over 4s.

The result of the Ministry's scheme has been that there are now fifty Societies at work covering most of the country, and that the number of cows recorded under the scheme is over 130,000, belonging to more than 5,000 farmers. There has been a steady increase in the average milk yield of the cows recorded, which has risen from 599 gallons in 1918 to 670 gallons in 1925, in the case of cows recorded for a full year, and the cash value of the increased milk yield at 1s. per gallon varies from £12 to £24 per cow. The average estimated milk yield for all the cows in the country is not more than 450 gallons, and it is obvious therefore that there are great possibilities of increased production and profit by the adoption of milk recording and the consequent elimination of cows with a poor milk yield.

Members of Milk Recording Societies can obtain from the Ministry for a small fee a certificate of the milk yield and history of recorded cows, and certi-

ficates of Merit are issued for cows which have been recorded for three years and have calved three times during that period. The importance of milk pedigree is now recognised, and to an increasing extent the price of dairy cows is based on the authorised record of their yield.

In order to assist purchasers who desire to obtain dairy cattle with good milking records or the progeny of such animals, the Ministry publishes each year a Register of Dairy Cattle containing particulars of animals whose records or the records of whose dams have been taken under the Ministry's scheme, and whose milk yield has been not less than 800 gallons for the year. The number of entries is 7,500, and more than half are 1,000 gallon cows. Twelve cows gave 2,000 gallons or more.

Export of Live Stock

The reputation of British pedigree live stock is such that there is a demand for it all over the world for breeding purposes, and in normal times an export trade of considerable value is carried on. Foreign countries, however, and our own Dominions have made regulations governing the conditions under which live stock may be imported, in order to prevent the risk of introducing disease. Many of these regulations require that animals imported from Great Britain shall be accompanied by certificates as to freedom from disease in the districts from which the animals come, and the Ministry undertakes to issue such certificates on application by exporters. Also, in order to assist breeders in this country, the Ministry keeps up to date full

information as to the requirements of the various Foreign countries and Dominions, and regular exporters are supplied for a small charge with a complete summary of all the importation regulations, and are notified of any alterations. The Ministry also publishes a Handbook of British Breeds of Live Stock, with illustrations of types of all the recognised breeds.

Licensing of Stallions

In order to prevent the use of unsound stallions, which were seriously impeding the breeding of sound horses of good conformation, the Ministry established in 1911 a voluntary register of pedigree stallions, which could be certified as sound for breeding purposes. This register enabled breeders to obtain the services of sound stallions, but it was found that no voluntary scheme was effective in eliminating many unsound stallions which travelled at very low fees, and accordingly compulsory powers were obtained in 1918 by the Horse Breeding Act. This Act prohibits the travelling or exhibition for service of any stallion of two years old and upwards unless it has been licenced by the Ministry as sound for breeding. A fee of £1 1s. od. per annum is payable for a licence and the licences are granted by the Ministry after examination by a Veterinary Surgeon. Owners may appeal on payment of a fee of five guineas (which is returned if the appeal is successful) to a panel of referees consisting of Veterinary Surgeons or other competent persons selected by the Ministry. In the first year after the Act was passed over 4,000 stallions were

examined and 10 per cent. were refused licences. Since then the numbers have fallen considerably owing to the decline of Horse Breeding, and the percentage of refusals has also been greatly reduced. The Act has been successful in eliminating the unsound travelling stallion, and it is rarely necessary nowadays to have to take proceedings in respect of an unlicensed stallion.

The National Stud

The Ministry of Agriculture is responsible for the National Stud, which was established in 1916 as a result of a generous offer by Lord Wavertree to present to the nation his valuable stud of thoroughbred stallions, mares and horses in training and the live and dead stock at his breeding establishment at the Curragh, Ireland, and his training establishment at Russley Park, Wiltshire, provided that the Government purchased the freeholds of the properties. The object of Lord Wavertree's gift was to encourage the breeding of the highest class of thoroughbred as being the foundation stock of all light horses, and the reservoir from which are drawn cavalry and other riding horses required by the Army.

The value of the gift amounted to over £80,000 at pre-war prices, and the Government paid over £65,000 for the purchase of the two properties. The Stud included such famous stallions as "Royal Realm," the winner of the Summer and Autumn Cups at Newbury and the Gimcrack Stakes; and "White Eagle," the winner of the City and Suburban and the Sussex Stakes at Goodwood, who also ran second in the Coronation Cup. Among the mares was

“Merry Gal” who won seven races of a value of over £13,000 and was second in the Oaks, and the horses in training included “Great Sport” who was third in the Derby, and “Night Hawk” who won the St. Leger. “Minoru,” who won the Derby and the Two Thousand Guineas for King Edward VII, was bred at the Stud.

It was obviously a very speculative enterprise for a Government Department to undertake the responsibility for a racing stud, and there were not wanting many dismal prophets to foretell that the acceptance of Lord Wavertree’s gift would involve the loss of considerable sums of public money. This indeed might well have been the case if the Ministry had not been fortunate enough to secure as Director the services of Sir Henry Greer, a former Steward of the Jockey Club, and a man who had won great success as a breeder and on the turf. Under his able and shrewd direction the National Stud has been carried on not only without loss, but has made profits more than sufficient to pay the whole cost of the purchase of the Stud property. At the same time the value of the blood stock at the Stud has been steadily increased. An independent valuation in 1926 placed the value of the blood stock at £146,250 for sixty-two animals as compared with the valuation of £48,040 for eighty-one animals at the time of the gift by Lord Wavertree in 1916. At that time values were uncertain owing to the discontinuance of racing during the War, but after discounting that factor the figures are eloquent testimony to the successful management of the Stud by Sir Henry Greer.

The Stud is carried on with a view to the exhibition and sale annually of a number of yearlings of fine physique and conformation, in order to indicate the type of thoroughbred which is considered desirable and to encourage breeders to produce horses of similar type. In order to provide that encouragement it is necessary to show that the horses are successful on the race course, which is the supreme test of a horse's soundness, stamina and constitution. Consequently the success of the National Stud is judged by its success in breeding winners, and judged by that test it has been remarkably successful. During the period from 1922-1925 the National Stud bred more winners than any other Stud, including such famous horses as "The Panther," "Royal Lancer," "Diligence" and "Warden of the Marches."

The Ministry is therefore directly interested in racing, but, although it breeds race horses, it does not also undertake the direct responsibility of training and racing them. Lord Wavertree's training establishment at Russley has been handed over to the War Office, by whom it has been let on lease, and the majority of the horses bred at the National Stud are sold as yearlings at Newmarket. This is the most profitable course to adopt, since blood stock average much higher prices when sold as yearlings than at any other age, owing to the fact that the purchaser of a yearling pays not only for the horse itself but also for the possibilities of its racing career, which, if successful, will bring in large sums in winnings and will greatly enhance the value of the animal for stud purposes. The

highest price realised by the National Stud for a yearling was 18,000 guineas, and the total receipts from the sale of 152 yearlings up to the end of 1926 was 185,000 guineas, or over 1,200 guineas each.

At the same time, a few of the colts and fillies bred at the Stud which are of exceptional merit are retained to maintain the breeding stock of the Stud, and, in order that they may be tested on the turf, they are leased for their racing careers. Lord Lonsdale has been good enough to lease any horses which are retained by the Stud, and he pays all the expenses of training and racing them, and hands over to the Ministry one-third of their winnings on the turf. The receipts of the Ministry from its share of the winnings up to 1927 amounted to approximately £13,000, and the races won by National Stud horses include the St. Leger, the City and Suburban, the Irish St. Leger, the Jubilee Handicap and the Chesterfield Cup. The Stud has not yet produced a Derby winner since it became public property, but it is one of the ambitions of the Ministry that it will do so in the near future. His Majesty the King has recently signified that he will honour the Stud by leasing four yearling colts for racing purposes.

In connection with the National Stud, the Ministry is responsible for the care and upkeep of the famous Japanese garden which was constructed by Lord Wavertree at Tully and forms part of the National Stud property. This garden, which is probably the finest example of the kind in Europe, was laid out by Mr. Minoru, an eminent Japanese gardener, whose name was given to the horse bred

by Lord Wavertree, which subsequently won the Derby for King Edward VII in 1909.

Poultry

No branch of agricultural production is more widely distributed than poultry keeping. It interests not only the large farmer and the small holder, not only men but women, not only the rich man in his castle but the poor man at his gate, as well as the back-yarder in the crowded centres of population in the great towns. Its output exceeds in value that of the wheat crop, but there is no form of food production which offers greater possibilities of development, or more opportunity of reducing our dependence on imported supplies, the value of which amounts to £19,000,000 a year.

It is difficult to obtain accurate figures of the number of poultry in the country, but it is estimated that there is one hen to each acre. Slogans are the fashion of the day, and just as the political slogan of three acres and a cow overturned a Government, so an agricultural slogan of two hens to the acre would do much to oust the foreign egg from the British breakfast table.

Up till recently the Ministry did little or nothing to help poultry keepers, but in the last few years increasing efforts have been made to increase the number and quality of British poultry; efforts which have been admirably supported by the industry itself, which is perhaps the best organised branch of British agriculture, with its National Poultry Parliament and its National Poultry Council.

On the educational side, the work is carried out

by the County Councils, most of whom have whole or part time Poultry Instructors, who visit and advise poultry keepers, and give lectures and demonstrations in the best methods of hatching, rearing, fattening, killing and trussing of poultry and testing, grading and packing of eggs. In addition, they administer the Egg and Chick Distribution Scheme which was started by the Ministry during the War to provide poultry keepers in a small way with stock of good productive capacity at moderate prices from breeders whose plant and stock had been inspected and approved. Many County Councils also organise County Egg Laying Trials designed to encourage competition in egg production, to afford demonstrations of the good and bad points of the various breeds, and to provide object lessons in poultry management. The rules drawn up by the Ministry are designed to stimulate the production of good sized eggs by giving extra points for eggs weighing more than two ozs. The cost of the educational work of the County Councils is met by grants from the Ministry of two-thirds of the net expenditure.

In co-operation with the National Poultry Council, the Ministry has recently organised a National Poultry Institute at a cost of £26,000, of which one-fourth has been provided by the industry itself in a large number of small subscriptions collected from poultry keepers by the Council. The Ministry has also agreed to pay the expenses of maintenance of the Institute up to £6,000 a year. The Institute is designed to provide educational facilities for the training of poultry instructors, to carry out scientific

research work in breeding, nutrition and disease, and to conduct commercial experiments and breeding experiments for the production of eggs and of table poultry. A special poultry department has been established at the Harper Adams Agricultural College, where courses of scientific and practical instruction are given, and where commercial experiments in new methods of poultry keeping, new foods and new methods of housing are carried on. The research work in breeding and nutrition is carried out by the Cambridge School of Agriculture, and research into poultry diseases at the Ministry's Veterinary Laboratory at Addlestone. Experiments in breeding for egg production are conducted at the Reaseheath Farm Institute in Cheshire, and in breeding table poultry at Wye College in Kent.

The Ministry has also arranged for the production of a film showing all stages of commercial egg and poultry production, and for the preparation of 300 lantern slides on poultry keeping for the use of instructors and lecturers.

Chapter IX

SMALL HOLDINGS AND ALLOTMENTS

IN recent years an important part of the work of the Ministry has been in connection with the provision of small holdings and allotments. They have always been an integral part of British agriculture, and no less than two-thirds of the total number of holdings of one acre or more in England and Wales are classed as small holdings, viz. holdings not exceeding fifty acres, though some of them are residential properties which are not farmed for business. The number of small holdings is constantly subject to reduction by the growth of the towns and the need for land for industrial development and other non-agricultural purposes, and, as this reduction is not being made good under present economic conditions by private enterprise, there has been an increasing demand for State intervention.

In times past many public spirited large land-owners, notably such men as the Duke of Bedford, the Marquis of Lincolnshire, Lord Tollemache and Lord Harrowby developed a considerable number of additional small holdings on their estates, and found it a profitable enterprise. But since the War the increased burden of taxation has greatly reduced the capital resources of private landowners, while the high cost of building, road making, etc., and the higher rates of interest on capital have rendered the

subdivision of land and its equipment for small holdings a very expensive and uneconomic form of estate development. The result is that the extension of small holdings is becoming more dependent on the action of the State and of Local Authorities and upon financial assistance from the public purse. State intervention has also been necessary to meet the demand for opportunities of obtaining land for cultivation from men who are unable to obtain it by their own efforts, and for whom statutory powers of compulsory acquisition must be exercised.

The history of legislation in regard to small holdings dates from the Small Holdings Act of 1892, which was founded on the report of a Select Committee of the House of Commons presided over by Mr. Joseph Chamberlain. The Act authorised County Councils in Great Britain to acquire land by purchase or on lease, provided that it could be obtained by agreement. No compulsory powers of acquisition were conferred on Councils. The main object of the Act was to provide holdings for sale, but in certain cases they might be let to tenants. Purchasers were required to pay in cash one-fifth of the cost of the land and any buildings or other equipment provided by the Council, and the remaining four-fifths was payable in half-yearly instalments with interest spread over fifty years.

The Act however proved practically a dead letter. Only eight County Councils in England and one in Scotland made any use of its provisions, and the total quantity of land acquired in the whole of Great Britain in fourteen years was under 800 acres.

The Liberal Government, which came into power

in 1906, decided, in the words of Sir Henry Campbell Bannerman, to make a determined attempt to colonise our own country, and Lord Carrington (afterwards the Marquis of Lincolnshire) introduced a comprehensive Small Holdings Act which was passed into law in 1907 and was consolidated with the Act of 1892 in the following year. This Act, which was confined to England and Wales, retained the County Councils and the Councils of County Boroughs as the authorities responsible for the creation of small holdings, but it provided also for the establishment of a body of Small Holdings Commissioners under the Board of Agriculture, who were empowered to prepare schemes for the creation of small holdings in the various Counties, and to send them to the Councils for execution. If a Council failed to prepare a scheme of their own or refused to carry out a scheme prepared by the Commissioners and confirmed by the Board, the Commissioners might be directed by the Board to carry out the scheme themselves, and any expenses incurred thereby could be recovered from the County Council in default. The Act conferred on Councils the power of purchasing or hiring land compulsorily, subject to confirmation by the Board in each case, and it provided that the price or rent to be paid should be fixed, in default of agreement, by an arbitrator or valuer appointed by the Board. In previous cases of compulsory purchase a custom had grown up of allowing the owner an additional 10 per cent. on the ordinary market price of the land in consideration for being compulsorily dispossessed of his property. This practice was pro-

hibited by the Act, and in the case of land compulsorily hired, it was provided that the rent should be the ordinary agricultural rent of the land, without regard to what it might be worth for other purposes. On the other hand, the owner was safeguarded by being allowed to resume possession of his land on twelve months' notice, if he could satisfy the Board that he required it for building, mining or other industrial purposes.

Several of these provisions were novel features in land legislation and in the relations between the Central Government and Local Authorities. The procedure for the compulsory acquisition of land has on the whole worked satisfactorily and fairly to all concerned, though the effect of the altered procedure as to the price or rent payable has not been very marked. The default provisions, which were intended as a means of coercing reluctant or backward Local Authorities, proved largely unnecessary, and, in addition, the numerous safeguards which were introduced made the process so lengthy and cumbrous that it was very little used. In fact only one case occurred where the default procedure was carried through to completion, and in that case the authority concerned, the Council of a County Borough, was not unwilling that the Board should take over their responsibility.

In the great majority of cases, the Councils, finding that there was a large demand for small holdings from men who had the necessary experience and capital, were prepared to acquire the necessary land for them, especially as the men were prepared to pay rents which recouped all the costs of the

Councils, and consequently no charge fell on the local rates.

The costs of acquiring and equipping the land were met by loans borrowed by the Councils from the Public Works Loan Board, and repayable by half-yearly instalments of interest and sinking fund over a period of years. The rate of interest on the loans was 3½ per cent. The Board of Agriculture was responsible for approving the terms on which the land was acquired, and the proposals of the Councils for sub-division and equipment, and for recommending the Local Government Board (now the Ministry of Health) to sanction the necessary borrowing. This involved a close liaison between the Commissioners, who acted as the local agents of the Board of Agriculture, and the officers of the Local Authorities. Proposals for acquiring land were considered in common, joint inspections were made to agree upon the price that could be paid, the expenditure on equipment that was necessary and possible, and the rents that would be obtainable for the small holdings. By these means friendly relations were established between the Board and the Councils, which did much to facilitate the operation of the Act in a spirit of partnership.

The outbreak of the Great War put a stop to the whole of this work. The whole of the financial resources of the State were required for the prosecution of the War, and no funds were available for small holdings development. The end of the War, however, produced a revival of the problem in a new and specially acute form. During the recruiting campaign for the Forces, promises were

made of opportunities for land settlement after the War, and somewhat lavish expectations were excited of the homes for heroes that would be provided for the returning soldiers on demobilisation. Unfortunately the preoccupations of the War, and the uncertainty when it would end, prevented any adequate preparations being made, and when the Armistice was concluded in November 1918 and demobilisation became imminent, hardly an acre was available for land settlement. Moreover no definite information was available as to the extent of the probable demand, though some tentative inquiries among the soldiers in France had indicated that it might be very large.

In these circumstances the Ministry had to revive as rapidly as possible its own small holdings organisation and that of the County Councils, both of which had been diverted to the business of increasing food production during the War. Councils were urged, in advance of legislation and in anticipation of the demand, to acquire land for settlement. The financial aspect also required immediate attention. The War had grievously depleted the capital resources of the country and the national credit was greatly impaired. The day of loans from public funds at $3\frac{1}{2}$ per cent. had gone, possibly for ever, and the rate of interest could not be less than $5\frac{1}{2}$ per cent. and soon had to be raised to 6 and then to $6\frac{1}{2}$ per cent. The result was that no scheme of land settlement for ex-Service men could be constructed on a self-supporting basis. It was doubtful if the County Councils could be persuaded to undertake any share of the inevitable loss on a

scheme which they would regard as a national tribute to the men who fought in the War. In any case there was no time for bargaining. It was clear that the Exchequer must be prepared to bear the whole of the financial burden, and the only question was whether the Ministry as the central authority should administer the scheme or whether the help of the Local Authorities should be invited.

There were disadvantages in either alternative. Central administration would involve a very large and expensive staff and would be liable to serious mistakes owing to its lack of local knowledge, which was particularly important both in the selection of suitable land and suitable tenants. On the other hand, local administration without any financial responsibility had obvious dangers of wasteful and reckless expenditure.

After careful consideration it was finally decided that the advantages of making use of the local knowledge and previous experience of the County Councils outweighed the possible dangers of financial irresponsibility or the value of the greater uniformity possible under central administration. It was hoped also that in spite of their lack of financial interest, the County Councils could be relied upon for economical administration, and that the general control of the Ministry would obviate any serious danger of wasteful expenditure.

Accordingly the Land Settlement Facilities Act of 1919 was passed, which provided that the whole of the losses incurred by County Councils in providing small holdings for ex-Service men should be paid by the Ministry at the end of each year

up to March 31st, 1926, and that at that date there should be a valuation of the properties and an ascertainment of the liabilities of the Councils, under which the Councils should take over full responsibility for the properties at such a price as should enable them to carry them on as self-supporting undertakings, the cost in excess of the value to the Councils being taken over and paid by the Ministry of Agriculture.

The Act provided that the small holdings should be let or sold at the best rents or prices which could reasonably be obtained, without regard to their cost, and a sum of £20,000,000 was voted by Parliament to be advanced by the Public Works Loan Board to the County Councils for capital expenditure. Of this sum £2,750,000 was allocated to Scotland, and the remainder was available in England and Wales. It was estimated when the Act was passed that the annual losses payable up to 1926 might amount to £400,000 a year, and that as a result of the valuation in 1926 it might be necessary to write off 40 per cent. of the total capital expenditure. These estimates proved too low, as the rate of interest on the loans had to be increased from 5½ per cent. to an average of 6 per cent. and the cost of building proved much higher than was anticipated in 1919. In point of fact the annual losses rose to £900,000 in 1924 and amounted in all to £4,875,000 for the seven years up to March 31st, 1926, and the result of the valuation was to write off approximately 60 per cent. of the capital expenditure. The net result is therefore that from the point of view of an investment of

public funds the State will not receive much more than 2 per cent. on its money, but on the other hand the Local Authorities will at the end of the loan periods enter into the unencumbered enjoyment of properties with a total rent roll of approximately £1,000,000 a year.

The Act of 1919 cannot however be regarded solely from the financial aspect. It was intended as an attempt to pay a debt of gratitude due to the men of the countryside who answered to their country's call during the Great War. From this point of view it has been a considerable achievement carried through with a large measure of success. The quantity of land acquired by County Councils in England and Wales was 255,000 acres and 17,000 new small holdings have been created; 2,779 new houses have been built and 2,317 new sets of farm buildings. The total capital cost was approximately £15,250,000, of which £9,600,000 is attributable to the purchase of land and the remainder to the cost of equipment. The average cost of the land purchased was £42 10s. an acre, and except as regards some 15,000 acres all the land was acquired by agreement without the exercise of compulsory powers. In spite of a serious fall in agricultural prices and a succession of bad seasons, most of the men settled have done well and the number of failures has been under 12 per cent.

The combined result of the two Acts of 1908 and 1919 has been to make the County Councils of England and Wales the largest landowners in the Kingdom. They are in possession of nearly 450,000 acres, occupied by 30,000 small holdings tenants,

and the administration of this large estate has called forth an immense amount of unstinted and self-sacrificing work on the part of the members of the Small Holdings Committees of the Councils.

In addition to the supervision of the establishment of County Council Small Holdings, the Ministry itself has undertaken similar work on a limited scale under the Small Holdings Colonies Acts, 1916 and 1918. The Act of 1916 empowered the Ministry to acquire by agreement not more than 6,000 acres in England and Wales for the purpose of establishing experimental small holding colonies, and the Act of 1918 increased the limit of acreage to 60,000 acres. Under these provisions the Ministry acquired a number of estates in different parts of the country amounting in all to nearly 25,000 acres. Some of them were acquired on long lease from the Crown, others were purchased for cash from private landowners in the open market, and the largest of all, the Sutton Bridge Estate of 6,000 acres of first-class land, was purchased from Guy's Hospital for an annual rentcharge.

The intention was that the Ministry should supplement the provision by County Councils of small holdings for ex-Service men by providing opportunities of land settlement of a somewhat different character, and by dealing with cases for which the Councils could not be expected to take any special responsibility. There were a number of ex-Service men who desired to settle on the land, but who had neither the knowledge nor the capital necessary to become small holders on their own account. There were other cases of men from the

large towns who had no claim on any particular County Council or men who desired to settle in some other part of the country than that in which they had been brought up. Accordingly the Ministry decided to establish two different kinds of settlements, viz. :—

(1) Small Holdings Settlements consisting of a number of separate small holdings grouped round a central farm, which would be farmed on behalf of the Ministry by a resident Director, who would be able to assist the small holders by furnishing them with horse labour, etc., at an economic price and by giving them a certain amount of paid employment on the central farm to supplement their income from their own holdings. He would also advise the small holders as to the cultivation of their holdings and help to organise co-operative enterprises.

(2) The other type of settlement took the form of large farms managed by a Director, on which the settlers would be employed as wage earners with a right to share in any profits earned.

The work of equipping the properties acquired by the Ministry was a very expensive and difficult one. It involved the erection of a large number of new cottages and farm buildings at a time when all building costs were excessively high, and when it was almost impossible to get firm contracts from private builders for work in rural areas. The result was that a considerable part of the work had to be carried out by direct labour employed by the Government either under the Ministry itself or by the Office of Works.

In all some 300 new cottages and some 200 new sets of buildings were erected, in addition to a large amount of work in adapting and altering existing buildings as well as in roadmaking, fencing and water supply. The Ministry itself became responsible for the erection of 200 cottages and 160 sets of buildings on five estates in different parts of the country, and for this purpose had to employ a number of architects to prepare plans, etc., and to set up a building department to carry out the work. At one of the settlements at Amesbury in Wiltshire a number of experiments were carried out partly in collaboration with the Department of Scientific and Industrial Research to test the relative merits and cost of building in different classes and types of material. Cottages were erected not only in brick and stone, but also in timber, in monolithic concrete, in chalk cob, in chalk and cement rammed, in *pisé-de-terre* and in concrete blocks. The experiment showed that several of these materials, particularly constructions in *pisé-de-terre* with unskilled labour, produced satisfactory cottages, but that there was no economy in cost compared with the use of brick or stone. The Ministry's experiments, however, resulted in evolving a more economical type of small holders cottage, which was subsequently adopted on the Sutton Bridge Estate and has been introduced into several County Council schemes.

At Sutton Bridge in Lincolnshire, the Ministry undertook the erection of sixty new houses and sets of buildings, as well as repairs and adaptations of existing buildings, fencing, drainage, water supply and roads at a total cost of some £75,000. For this

purpose the plant and works of a local builder were taken over, the necessary labour was engaged, bricks were made from earth on the estate and local materials were used as far as possible for weather-boarding, reed thatching, etc. A considerable part of this estate is still occupied by large farmers who hold their farms on lease, but as the leases fall in the farms are being subdivided and the necessary equipment provided in order to let them in small holdings. The whole of the estate consists of excellent land, specially suitable for cultivation in small holdings, and when the whole 6,000 acres have been developed it should constitute the best and largest small holdings colony in the country.

In the case however of some of the other settlements, conditions proved less favourable. Profit sharing farms, established at a time when costs and values were exceptionally high, were severely hit by the fall in agricultural prices after 1921, and not only produced no profits but incurred heavy losses. Farming from Whitehall, never a popular or easy enterprise, became hopelessly discredited when each year the Ministry had to present to Parliament trading accounts showing colossal losses. It was true that the accounts were so devised by the Treasury as to put the blackest possible complexion on any Government enterprise, and that large farmers in private business were making similar losses. But such attempts at justification were unconvincing, and it was decided to abandon the experiment, except in the case of Amesbury, where a particularly capable local Director had succeeded throughout the years of depression in making a

profit of nearly 5 per cent. on the farming capital invested.

At the same time it became necessary to modify the policy in regard to the small holdings settlements. The central farm which was intended to stimulate and assist the individual enterprise of the surrounding small holders proved a pauperising and enervating influence, and the resident Director was expected to subsidise the small holders by supplying them with horses or the use of implements at less than cost price, and by giving them employment on the central farm when their labour was not required. It was decided therefore to divide into small holdings the various central farms, to dispense with the services of the resident Directors and wherever possible to hand over the settlements to the County Councils to be managed in conjunction with the properties they themselves had acquired.

As a result of these changes the Ministry now remains in possession of only 10,000 acres out of the 25,000 acres originally acquired, the remainder having been either transferred to the County Councils or sold. It is only fair to say that the properties retained by the Ministry are very successful examples of land settlement and that though the cost of their establishment was inevitably heavy, it does not compare at all unfavourably with the cost of similar schemes carried out by County Councils.

In view of the experience gained, however, it seems clear that small holdings development in the future should be carried out by County Councils rather than by the Ministry direct, though for

some time to come there will have to be a measure of financial assistance from the Exchequer and consequent supervision of the operations of the Councils by the Ministry. The special scheme for the settlement of ex-Service men having been completed, Councils are in a position to deal with the demand for small holdings from the ordinary type of civilian applicants with whom they dealt under the Act of 1908, and the Small Holdings Act of 1926 empowers them to provide small holdings on similar lines, except that the Ministry will meet 75 per cent. of the approved estimated annual loss, and that the Ministry has no power to compel a County Council to provide small holdings if it does not desire to do so. As the establishment of small holdings under present conditions will almost always involve some charge on the local rates, it is considered that the question whether such charge should be imposed must be left to the discretion of the Council concerned, which will naturally be affected by the strength of the demand for small holdings by its own constituents.

Allotments

While small holdings have always been the subject of some controversy, there is little or no difference of opinion as to the value of allotments, though it is on record that a proposal of Cobbett to the vestry of Bishops Waltham that the Bishop of Winchester should be asked to grant an acre of waste land to every married labourer was defeated on the ground that it would make the men "too saucy," that they "would "breed more children"

and "want higher wages." From a different point of view, Malthus argued that the provision of allotments would only result in still worse over-population, and John Stuart Mill believed that they would depress wages. On the other hand, Arthur Young was an enthusiastic advocate of allotments, and he prepared a grandiose scheme for spending twenty millions in setting up half a million families with allotments and cottages. He was particularly in favour of giving cottagers enough land to enable them to keep some live stock, and he declared that "a man will love his country the better even for a pig." But, at the time, his words fell on deaf ears, and it was not till the famous Poor Law Commission of 1834 made a thorough inquiry into the whole question that there was an official endorsement of the policy of supplying allotments in the form of small areas of land not exceeding half an acre which could be cultivated by a working man in his spare time.

From that time onwards allotments were steadily developed in the agricultural areas mainly by public spirited landowners. Parliament gave powers at different times to Poor Law or parish authorities to provide allotments, but these were only exercised to a very limited extent. It was not till 1887 that the first Allotments Act was passed which imposed a duty on the sanitary authorities of urban and rural districts to satisfy any demand for allotments not exceeding one acre in size, and provided that if land could not be acquired for the purpose by agreement it could be purchased compulsorily under a provisional order made by the county authority.

which had to be submitted by the Local Government Board to Parliament for confirmation. A later Act of 1890 provided that the County Council could act in default of the sanitary authority on the representation of six Parliamentary electors or ratepayers.

In 1894 Parish Councils were established and were empowered to provide allotments. If they could not acquire land by agreement they could apply to the County Council for an order authorising them to hire, but not purchase, land compulsorily. Such an order had to be confirmed by the Local Government Board, but did not have to be submitted to Parliament. No limit of size was placed on allotments on land acquired by agreement, but land hired compulsorily could only be let in allotments not exceeding four acres of pasture or one acre of arable and three acres of pasture.

Prior to the Act of 1894, only 2,249 acres were acquired by Local Authorities, but the Act gave a great stimulus to the movement and from 1894 to 1902, 18,603 acres were acquired, of which Parish Councils were responsible for 15,269 acres, on which over 30,000 allotments had been provided.

By the Small Holdings and Allotments Act of 1908, the Board of Agriculture was substituted for the Local Government Board as the central authority responsible for allotments, and extended powers were given to secure that the demand for them should be met as far as possible. These powers were supplemented by the Land Settlement (Facilities) Act, 1919, and by the Allotments Acts of 1922 and 1925.

The primary responsibility for the provision of allotments is placed in London on both the London County Council and the Metropolitan Borough Council. In the rest of the country the primary authorities are the Borough Councils, the Urban District Councils, the Parish Councils and where there is no Parish Council, the Parish Meeting. If there is default on the part of a Parish Meeting or Council, or the Council of an Urban District or non-County Borough, the County Council may take over their powers and provide allotments at the expense of the defaulting Council. If there is default on the part of the London County Council, a Metropolitan Borough Council or the Council of a County Borough, the Ministry can exercise the powers of the defaulting authority at their expense. In addition, in other areas the Ministry can step in and act if there is failure on the part both of the primary authority and of the County Council.

The Ministry is therefore constituted the ultimate authority for the provision of allotments, but in practice it is not usually found necessary to put in force the default procedure. The Ministry is constantly appealed to by would-be allotment holders, but, as a rule such complaints can be dealt with by friendly representations to the Local Authority concerned, and in the main the authorities are sympathetic to the allotment movement and are prepared to extend it wherever possible.

In urban areas the obligation of the authority is limited to the provision of allotment gardens not exceeding twenty poles in extent; but in rural areas

the authorities are under a statutory obligation to provide allotments up to one acre in extent.

The authorities have ample powers to acquire land compulsorily either by purchase or hire, but all compulsory orders have to be submitted to the Ministry for confirmation, and if objections are received, the Ministry instructs one of its Commissioners to hold a local inquiry at which the views of all concerned are heard. On the report of the Commissioner, the Minister decides whether or not the Order should be confirmed.

The wide powers given to Local Authorities in recent years have resulted in a great increase in the number of statutory allotments. The number of allotment holders accommodated on land acquired by Local Authorities increased from under 50,000 in 1902 to nearly 520,000 in 1925, and the area from 20,800 acres to 66,000 acres. During much the same period the number of allotments provided by private owners, including Railway Companies, remained fairly constant between 500,000 and 550,000, so that the great development of allotments in the last twenty-five years has been mainly due to the Local Authorities under their statutory powers.

In the main, the demand for allotments in rural areas has been fairly well satisfied, but there is still a large unsatisfied demand in urban areas, partly from new applicants and partly from men who are dispossessed from their allotments owing to the land being required for building. In many of the large towns the quantity of land available for allotments is very limited in area and prohibitive in price so far as purchase is concerned. There is also con-

siderable competition for the use of any such land by the demand for playing fields and recreation grounds. It is hoped that these difficulties will be to some extent mitigated in future by the provision in the Allotments Act, 1925, which requires authorities to consider what provision should be made for the reservation of land for allotments when any town planning scheme is being prepared.

The shortage of food during the Great War gave a great impetus to the allotment movement. Under the Defence of the Realm Act the Ministry was empowered to enter upon and take over any land and arrange for its cultivation as allotments. The powers of the Ministry were delegated to the urban Local Authorities, and the total area taken over exceeded 18,000 acres, which was let to some 275,000 allotment holders. No rent was payable by the Ministry for this land, but at the end of its occupation the Ministry was liable to compensate the owners of the land for any loss they sustained, to pay compensation to any allotment holders who had to be dispossessed at short notice, and to meet part of the expenses of the Local Authorities who acted as agents of the Ministry. The Ministry withdrew from possession of this land on March 25th, 1923, but some of it was retained for allotments by the Local Authorities under their ordinary allotment powers. The net expenditure of the Ministry in respect of its occupation of the land was under £5 an acre, and, as much of the land was held for six years, it was not an extravagant price to pay for the value to the nation of the additional food produced. Prodigies of valour were performed by the allotment

holders in the cultivation of all kinds of vacant plots in the great towns, and in the words of Lord Ernle they produced "cabbages from concrete and broad beans from brickbats." This war experience fostered a taste for gardening among large numbers of the urban population, which has survived to a considerable extent in peace time, and there is no part of the work of the Ministry which is of greater human interest and value than the endeavour to assist the working classes to obtain opportunities of cultivating small portions of their native soil.

Chapter X

HORTICULTURE AND PLANT DISEASES

THE Act which established the Board of Agriculture in 1889 included horticulture in the definition of agriculture, but for a good many years little or no provision was made for the special needs of the growers of fruit, vegetables and flowers, who comprise the horticultural side of the agricultural industry. In recent years, however, there has been a great development. The experience of the War with its extension of the allotment movement emphasised the value and importance of the intensive cultivation practised by horticulturists, and the responsibilities of the Ministry for the creation and maintenance of small holdings rendered it necessary to pay particular attention to the needs of the small occupiers who form so large a part of the horticultural industry.

In addition to the claims of the smaller cultivators, the large scale production of fruit and vegetables presents many problems for the solution of which State assistance is necessary. Foreign competition becomes increasingly severe each year, and if our own producers are to retain a fair share of the home market for fruit and vegetables they must be assisted to produce goods of the highest possible quality, which will appeal to the taste of the consuming public, and must organise and improve their methods

of marketing. In addition there are all the problems of combating the numerous diseases and pests which are such a serious handicap to the profitable cultivation of fruit and vegetables.

The horticultural work of the Ministry falls under three main heads :—

- (1) Research, Education and Demonstration.
- (2) Commercial development.
- (3) Control of plant pests and diseases.

Research and Education

The fundamental research work on the problems of horticulture has been described in the chapter on Agricultural Research (pp. 104-128) and horticultural education is included in the general provision for education at the Agricultural Departments, Colleges and Farm Institutes, which has been described in Chapter VI (pp. 89-103). Provision is also made for practical horticultural instruction through the County Councils, most of which have appointed instructors whose duty it is to give advice and assistance to growers in the County. In the principal fruit growing counties, the Ministry has urged the appointment of a highly trained and experienced horticulturist, who is competent to advise and assist the larger commercial growers, whose problems differ from those of the domestic horticulturists or the allotment holders. In order to encourage the appointment of such Horticultural Superintendents, the Ministry pays 80 per cent. of their salaries and expenses.

One of the most important means of educating growers in up-to-date methods of cultivation is by

the establishment of Demonstration Plots, which provide ocular evidence of the value of the methods adopted. The Ministry therefore drew up a comprehensive scheme of demonstration and test plots to illustrate the best methods of cultivation and manuring, and the choice of the most suitable varieties for each district. Special arrangements were made for a large number of potato demonstration plots in view of the economic and food value of the potato crop, and a scheme was also prepared for the provision of a number of model allotments of 10 rods each, to be planted and cultivated on approved lines and the crops weighed as lifted. A chart showing the suggested cropping and arrangement of the model allotments was printed with an explanatory leaflet, and over 100,000 copies have been distributed.

As a result of these arrangements, 474 demonstration plots have been established, of which 118 are for fruit and vegetables, 200 are potato demonstration plots and 156 are model allotments. Many of these plots have been carried on for five or six years, and they have already had a considerable influence in indicating to the growers of the district the methods and varieties best adapted to the local conditions. At one plot, where records were kept, over 500 persons came to inspect it in one half year, and the ocular evidence which the plots afford is far more effective than any number of lectures or leaflets. The potato trials have been carried out on standardised lines so that comparisons can be made with different districts, and valuable information has been obtained as to the cropping qualities of new

varieties which are immune to wart disease. Special attention has been paid to trials of varieties of spring cabbage, and co-ordinated trials of strawberries have been arranged to test selected plants and to demonstrate the advantages of improved methods of cultivation and systematic selection of runners. It will be some years before definite results can be established by the fruit plots, but it is hoped that they will show growers the importance of concentrating on the growth of a small number of the very best varieties, and lead them to discard varieties which are unprofitable and unsuited to the district.

Commercial Development

We have become familiar lately with the slogan "Eat More Fruit." But, if the home producer is to obtain a fair share of the increased consumption aimed at, he must market his produce so as to compete with imported supplies. There is very great need for improvement in packing and grading. This is particularly the case in regard to apples. Though the best English apples have no rival in the world, it is too often the case that nothing but imported varieties can be obtained in the shops, because the retailers find that they can be obtained in uniform quality and quantity throughout the year.

One of the handicaps to the sale of home produce was that there were no recognised sizes for the containers of fruit and vegetables. They appeared on the market in all kinds and shapes of packages without any guarantee of the weight of the contents. The Ministry, therefore, drew up a scheme for the standardisation of packages which was submitted to

the trade. The general principle was approved, and it was agreed that the cubic capacity of the standard packages should be settled, and that packages of that standard capacity should be stamped as approved by the Ministry. A beginning was made with chip baskets for strawberries: two sizes have been standardised, and a number of firms of basket manufacturers are turning out baskets of the standard capacity stamped "Capacity approved by the Ministry of Agriculture."

In order to encourage the proper grading of fruit, particularly apples, the Ministry has arranged in recent years a large number of demonstrations in up-to-date methods of grading and packing in different parts of the country, and classes in the grading and packing of fruit have been held in co-operation with the County Councils in the principal fruit growing districts. In 1923 the Ministry imported from America a Cutler Grading Machine which grades apples into eight sizes and is capable of dealing with 400 bushels per day. This machine was used for demonstrations at a number of centres with satisfactory results. It was subsequently purchased by a grower, and a number of growers have imported similar machines on their own account. In 1924 the Ministry established an experimental Apple Packing Station equipped with modern machinery at Cottenham in Cambridgeshire. The local growers were invited to bring in their apples and have them graded and packed by the staff employed by the Ministry. At the end of the first season the Station was taken over by a local association of growers, and similar packing stations have

since been established in other parts of the country by private enterprise.

One of the problems of commercial horticulture is the disposal of the surplus production. Before the War it was mainly absorbed by manufacture into jam, but the high price of sugar greatly reduced the consumption of jam. At the same time the imports of tinned fruit have greatly increased, but until recently little or no effort was made to develop the canning of home grown fruit, and a monopoly of the market was left to the importers. Experimental work on the technique of canning and fruit preservation was carried out by the Ministry during the War, and since continued by the Long Ashton Horticultural Research Station, and, as a result of a conference of the industries concerned together with the tin plate manufacturers, which was called by the Ministry, a National Food Canning Council has been established. It is hoped that this will result in the development of the canning industry in this country on a commercial scale, which should provide an alternative outlet for surplus production in times of glut.

In order to supply the industry with commercial intelligence, the Ministry issues monthly reports on the condition of the principal commercial horticultural crops, and forward estimates of probable yields of fruit crops and estimates of actual yields are issued from time to time. Contact between the Ministry and all sections of the industry is maintained by means of the Horticultural Advisory Council and the Potato Advisory Committee. Both these bodies include representatives of all the principal organisations of growers, distributors and retailers.

Control of Plant Diseases

The reputation of British fruit on the market is seriously damaged by the prevalence of insect and fungoid pests, many of which cause most serious losses to the horticultural industry. A constant warfare is necessary to check the spread of the numerous old-established diseases and to prevent the introduction of new ones. Research on the problems of plant pathology is carried out at Rothamsted, and advisory work is in the hands of the Advisory Entomologists and Mycologists who are attached to the Agricultural Departments and Colleges, in conjunction with the staff of the Ministry's Pathological Laboratory at Harpenden.

The Ministry itself is responsible for the administration of the statutory powers for the control of plant diseases and pests. These originated in 1877, when an Act was hurriedly passed through Parliament giving the Privy Council power to make Orders to prevent the introduction into this country of the Colorado Beetle, an insect which does great damage to the potato crop in America. The Act authorised the prohibition of the importation of potatoes or other vegetables from countries whence the pest might be introduced, and it empowered the destruction of any crops on which the Beetle might be found, and the payment of compensation out of the rates for crops destroyed. As live specimens of the Colorado Beetle were being advertised for sale to collectors, the Act also authorised the making of Orders prohibiting under a penalty of £10 the keeping or exposing for sale of any specimen of the Beetle.

The Ministry of Agriculture inherited the powers of the Privy Council under the Act, and the Orders made have been effective in excluding the Beetle. The last occasion on which it appeared in this country was in 1901, when it was found on some allotments at Tilbury belonging to one of the Dock Companies. The crops and grass on the affected area were immediately destroyed, the ground was soaked with paraffin and heavily dressed with gas lime ploughed in. A few specimens of the Beetle were found in the following year, and were promptly destroyed, and since then it has not appeared in this country.

In 1907 the Act of 1877, which had been confined to the Colorado Beetle, was extended to include any insect, fungus or other pest destructive to agricultural or horticultural crops or to trees or bushes. This was done largely in consequence of the spread of American Gooseberry Mildew, which was practically unknown in this country before 1906, but which was introduced on imported stocks and spread so rapidly that it soon got out of control.

The efforts of the Ministry under the Act of 1907 are directed to prevent the introduction of new pests and to control the spread of old ones. The first object is secured by an Order which requires all living plants or trees, as well as potatoes, gooseberries and onion and leek seeds, which are imported into this country, to be accompanied by a health certificate given by a duly authorised officer of the Phytopathological Service of the country of origin. One copy of the certificate has to be produced to the Customs officer at the port of landing and the other

sent by the importer to the consignee. In the case of importations by post, a copy of the certificate must be fixed to the package. The certificates have to state that the contents of the consignment have been inspected and found free from any of the diseases scheduled in the Order.

Any plants, etc. which are not accompanied by a health certificate must be retained until they have been inspected and passed by an Inspector of the Ministry, and if they are found to be unhealthy they are destroyed or returned to the country of export. The Inspectors of the Ministry also have power to open and examine any imported consignment even if it is accompanied by a health certificate.

Most of the Dominions and foreign countries have adopted similar precautions to safeguard them against the introduction of diseases, and the Ministry has had to arrange for the issue of health certificates in regard to plants, etc., exported from this country. This export trade is of considerable and increasing volume and value, and the work of inspection and certification calls for the services of a large number of expert Inspectors. Fees are charged for their work, and the service is financially self-supporting. In recent years over 5,000 certificates and copies for plants, bulbs, etc., have been issued annually, and in addition many hundred certificates are issued in respect of thousands of tons of potatoes intended for export.

Measures for the prevention of the spread of pests already established in this country have been taken in two main directions. In the case of some of the more important and widespread pests, such

as Wart Disease of Potatoes and Silver Leaf, special Orders have been made and adapted to their special conditions. Other pests are controlled by a general Order which aims at securing that only clean and healthy stock should be offered for sale. The Order prohibits the sale of any plants which are substantially attacked by any of the insects or pests scheduled in the Order, and authorises the Inspectors of the Ministry to require the treatment or even the destruction of any substantially attacked plants which are exposed for sale. Many hundred visits of inspection are paid each year to Auction Marts, Nurseries, etc., and the reports of the Inspectors show that the Order has effected a marked improvement in the quality and health of plants distributed by English nurseries.

Wart Disease of Potatoes

One of the most serious handicaps to the progress of potato growing has been the spread of Wart Disease. It is due to a fungus which attacks both haulms and tubers, and the spores of which may live in the soil for many years. In spite of a great deal of experimental work, no cure has yet been found, and all land on which the disease has occurred at any time remains infected. For some years attempts were made by restrictions and measures of control to prevent the spread of the disease, but it was already so firmly established in many parts of the country that it seemed probable that nothing could prevent its spreading in time to the great potato growing areas of the eastern counties. This would have been a disaster which would have practically

destroyed potato growing in Great Britain. Fortunately the problem of dealing with the disease was greatly simplified by the discovery by one of the Ministry's Inspectors that there were certain varieties of potatoes that are immune to Wart Disease. The Ministry, therefore, arranged a number of trials of potatoes on infected land in a number of districts, which proved that while the majority of the commoner varieties of potatoes in general use were susceptible to the disease, there were a few varieties which remained immune even though grown for several years in succession on highly infected soil.

The establishment of this fact was of the greatest importance to the potato growing industry, and it has formed the basis of the Ministry's efforts in recent years to prevent the spread of the disease and to secure in course of time its eradication. Unfortunately, some of the most popular varieties of potatoes are highly susceptible to the disease, and its eradication depends on the production of immune varieties which possess cropping qualities and general merits comparable to those of the susceptible varieties. Considerable progress is being made in that direction, but it has not yet been possible to displace entirely such a popular variety as King Edward, which is susceptible to the disease, by any immune variety which is of equal commercial value.

In the meantime the policy of the Ministry is directed to prevent as far as possible the spread of Wart Disease by scheduling the areas within which the disease is prevalent, prohibiting the export of non-immune potatoes for seed purposes from those

areas to clean areas, and forbidding the use or sale for seed of any potatoes unless they are certified as having been grown on clean land, or of an approved immune variety. These provisions are embodied in an Order under the Destructive Insects and Pests Acts, and the effect is to provide the protection of clean seed to the potato growing industry.

Ormskirk Potato Testing Station

Since 1914 a series of immunity trials of potatoes have been carried out by the Ministry on land at Ormskirk in Lancashire, which is heavily infected with Wart Disease. The trials were designed to test the immunity or otherwise of all varieties of potatoes, to demonstrate the disastrous results of planting susceptible varieties in infected soil, to record and classify accurately the different varieties in types or groups, and to prevent the use of synonyms. The success of any policy which is based on the use of immune varieties is dependent on growers being able to rely on obtaining adequate supplies of pure stocks of varieties which are really immune. The Ormskirk trials are therefore of great importance, and no variety is approved as immune by the Ministry or accepted by the trade until it has been tested at Ormskirk and shown no sign of the disease for at least two years in succession. Each year potato breeders send thousands of new seedlings to Ormskirk to test their susceptibility, since it is not worth while to raise a stock for sale of any new variety which is not immune to Wart Disease. In addition, there are usually over 100 entries of stocks of new varieties, comprising thirty-five tubers of each variety sent for

testing each year, and entries are received from growers in France, Germany, Holland and Australia as well as from this country. It is important to growers that varieties should be accurately named, and that old varieties should not be allowed to masquerade under new names. Arrangements have been made, therefore, for the recording of the detailed characteristics of all varieties, and their classification into recognised types or groups, so as to avoid certifying as a new immune variety an entry which is found to be an old variety renamed.

Chapter XI

SPECIAL CROPS AND RURAL INDUSTRIES

An important duty of any Department devoted to the needs of a particular industry is to explore methods by which it can increase its profits and at the same time benefit the nation as a whole. In the case of agriculture this involves experiments in the growth of new crops and the establishment of new industries on the land.

Beet Sugar

The most striking example is that of sugar, to which the Ministry has devoted special attention in recent years. Sugar is an article of primary necessity to all classes of the population, but until recently we were entirely dependent upon importation from abroad for the whole of our supplies. Our annual consumption of Sugar amounts to nearly two million tons, and the annual value of the imports at present prices, before payment of duty, is over £30,000,000. In 1920, when prices were exceptionally high, the price paid for imported sugar exceeded £70,000,000. Before the War, more than half of the imported sugar was beet sugar from the Continent, and though the proportion of cane sugar has increased since the War, we are still receiving over half a million tons a year of beet sugar from the Continent, principally from Holland and Czecho-Slovakia.

It is obvious that if we could produce from our own land a proportion of the sugar we require, it would be a great advantage. In addition to reducing our dependence on foreign sources of supply, which, as we found during the Great War, may be unobtainable in certain circumstances, the establishment of the sugar industry in this country would provide additional employment for our own people both on the land and in the factories. Moreover, from the agricultural point of view, the cultivation of sugar beet is of especial value. It is a crop which requires deep cultivation and heavy manuring, with most beneficial results to succeeding crops in the rotation. It is estimated on the Continent that an increase of from 10 to 15 per cent. is secured in the corn crop as a result of the growth of sugar beet. It provides an excellent cleaning crop in the rotation, for which the farmer receives a cash return, in place of the ordinary root crop of mangolds or turnips which is often expensive and unremunerative. The development of sugar beet is therefore one of the most hopeful means of maintaining the area of arable land and of assisting the production of corn, particularly on the lighter soils of the Eastern Counties. The leaves and tops of the beet are useful either as a manure to be ploughed in, or as a feeding stuff for stock, and the dried pulp from the sugar factories is an excellent cattle food, particularly for dairy cows.

Until recent years Great Britain was the only important country in the world which produced no sugar from its own soil. It is believed that experiments in growing sugar beet were made as long ago as 1835, but it was not till 1870 that the first sugar

factory was established at Lavenham in Suffolk. This proved unsuccessful and for many years no further attempt was made. Farmers would not grow beet till they saw a factory in being, and capitalists would not erect a factory until they were guaranteed the requisite supplies of beet. There was thus a complete deadlock, and it was clear that there was no likelihood of any development without some measure of Government assistance, such as had been found necessary in every other country in the early stages of the industry.

In the first instance therefore the Ministry of Agriculture devoted itself to an examination of the question whether sugar beet could be grown successfully on the land of this country. A series of careful experiments were carried out in 1911 at seven different centres in various parts of the country, at each of which a number of plots were cultivated with sugar beet under different conditions. The resulting crops were weighed and tested for sugar content, and the costs of production ascertained. A full report of the experiments was presented to Parliament, and the conclusion arrived at was that beet with a high sugar content could be grown in this country and that yields equalling, if not exceeding, those on the Continent could be secured without undue cost.

The other question which had to be decided was more difficult. Could sugar be manufactured in this country at a profit after paying an adequate price to the grower? On this point evidence became available from the experience of a sugar factory at Cantley, erected in 1911 mainly by Dutch capital, at which sugar was manufactured from

home grown beet during the years 1912 to 1915, after which the factory had to be closed owing to the prohibition of the export of sugar beet seed from the Continent during the War. During the four years 1912 to 1915 the Cantley factory produced 8,677 tons of sugar, but, in spite of the fact that the Government refrained from imposing any Excise Duty, losses amounting to over £250,000 were incurred.

The position was, therefore, that farmers would not undertake the growth of a new crop unless they were guaranteed a price which was in excess of what the factories could afford to pay. Both partners in the industry required help to support them during the early years when they were gaining experience and perfecting their methods. It was obvious that several years must elapse before farmers would produce yields comparable to those obtained on the Continent, and it would take at least as long before British manufacturers and technicians could acquire the skill of their Continental competitors. There was therefore a gap which could only be bridged by some form of Government assistance. This position was no different from that which occurred abroad. In every country State help was necessary in the early stages, and it could not be expected that Britain would be any exception.

There were, however, several preliminary difficulties which had to be overcome. The Free Trade policy of the country was averse to any measures of protection or of bounties such as had been adopted to foster the beet sugar industry abroad. Moreover, Great Britain had been a strong advocate of the

Brussels Sugar Convention, which pledged the adhering States not to give bounties on exported sugar, and which was interpreted as prohibiting the payment of grants to assist the manufacture of home grown sugar, some of which might be exported. A possible alternative of assisting the growth of sugar beet by grants from the Development Fund was explored, but the Development Act confined advances to bodies not trading for profit, and the Commissioners were therefore debarred from assisting the establishment of a commercial enterprise.

In 1913 the Government withdrew from the Brussels Convention and thereby gained its freedom to adopt any measures it thought fit to promote the establishment of the sugar beet industry. Owing to the advent of the War nothing could be done for the time being, but the sugar shortage during the War emphasised the danger of our complete dependence on imported supplies, and in 1919 the Government agreed to assist in the establishment of a new sugar factory in order to carry out a thorough experiment on a commercial scale.

A Company was formed with a capital of £500,000. The Ministry took up half the share capital, agreed to forego any interest on its shares for ten years, and for the same period guaranteed interest at 5 per cent. on the other shares which were taken up by the public. An estate of nearly 3,000 acres was acquired by the Company at Kelham in Nottinghamshire, in order to ensure the supply of a certain quantity of sugar beet, and a factory was erected and equipped with the necessary plant, which was obtained from France. The increased costs of materials and labour

in the years succeeding the end of the War resulted in a considerable excess in the cost of the factory as compared with the estimates, and further capital amounting to £240,000 had to be raised by the Company, of which the Ministry provided £125,000 on loan. At that time agriculture was prosperous, and in order to induce farmers to grow beet it was considered necessary to pay them as much as £4 a ton for sugar beet delivered to the factory. The Company produced over 2,000 tons of sugar in 1921-1922, but the financial results were disastrous. A loss of over £100,000 was incurred, the working capital of the Company was exhausted and the factory had to be closed for the following year.

At the same time the Cantley factory under Dutch auspices, which had been reopened in 1920, was experiencing similar difficulties. Losses amounting to over £140,000 were incurred in the two years 1920-1921 and 1921-1922, and it became clear that without some further measure of assistance from the State, the effort to establish the industry in this country would have to be abandoned. Up to that time the only advantage conferred on home grown sugar was that a somewhat lower Excise Duty was payable as compared with the Customs Duties on imported Foreign and Dominion sugar. The difference however only amounted to just over £6 a ton as compared with Foreign sugar, and under £2 a ton as compared with Dominion sugar. This difference was insufficient to counterbalance the high prices which had to be paid for beet and the fact that several years must elapse before factories operating a new process in this country could be expected to

become thoroughly efficient and capable of working up to full capacity.

It was decided therefore in 1922 to relieve home grown sugar from the payment of any Excise Duty for a sufficient period to enable the industry to become firmly established. The effect of this concession at the existing rates of duty was to give home grown sugar an advantage of £25 a ton over Foreign sugar and of £21 a ton over Dominion sugar. The result was that the factories at Cantley and Kelham were enabled to continue, and arrangements were made for the erection of a third factory at Colwick in Nottinghamshire. The losses incurred at Kelham were written off by a reduction of the share capital from £500,000 to £125,000, and the factory was leased to the Dutch owners of the Cantley factory on a profit-sharing basis.

These measures enabled both factories to make profits in the season of 1922-1923, and no call had to be made on the Ministry in respect of the Government guarantee of interest on the public shares of the Kelham Company. The quantity of sugar produced in that year was over 13,000 tons. But the troubles of the infant industry were not yet over. In 1924 the Labour Government decided to reduce the Customs Duty on imported sugar from £25 13s. 4d. a ton to £11 13s. 4d. a ton, which involved a corresponding reduction in the advantage given to home grown sugar by the remission from payment of Excise Duty. This would have made it difficult, if not impossible, for the existing factories to survive and would have effectively prevented the erection of any new factories. No capitalists would

invest money in the erection of a factory without some security of stable conditions for a period of years, and it was obviously undesirable that the hands of the Chancellor of the Exchequer should be tied in connection with a reduction of the Customs Duty, and a consequent lowering of the price of sugar, by the consideration that such action would damage the home grown sugar industry.

In these circumstances the Labour Government decided to abandon the method of assisting the industry by a remission of Excise Duty, and to substitute for it a direct subsidy on a diminishing scale for a period of years, which would be independent of any alterations of the Customs Duty. This decision was announced by Mr. Philip Snowden in July, 1924, as part of the Government's proposals for dealing with the unemployment problem, but the Labour Government went out of office before the proposals could be confirmed by Parliament. They were taken over, however, by the Conservative Government which succeeded them, and were embodied in the British Sugar (Subsidy) Act, which became law in March, 1925, with operation from October 1st, 1924.

The Act provided for the payment of a subsidy of £19 10s. od. a ton on all sugar manufactured from home grown beet in the four years 1924-1925 to 1927-1928 inclusive, of £13 a ton in the three succeeding years, and of £6 10s. od. a ton for the following three years. These rates of subsidy are paid for sugar of a polarisation exceeding 98 degrees, and lower rates are payable for sugar and molasses of lower polarisations on the same scale as is adopted

for the Customs Duty on imported sugar. On the other hand, an Excise Duty is reimposed at the preferential rate applicable to imported Dominion sugar, which has the effect of increasing the assistance given to home grown sugar over foreign by £4 5s. 6d. a ton.

It had been customary to relate the price paid to the farmers for beet with the world price of sugar, and in order to safeguard their position in the event of a heavy fall in price, the Act provided that the factories should pay during the first four years of the subsidy a minimum price of 44s. a ton for beet of 15½ per cent. sugar content with an addition or deduction of 3d. a ton for each one-tenth per cent. of sugar content above or below 15½ per cent. In point of fact, however, the farmers have succeeded by collective bargaining with the factories, carried out on their behalf by the National Farmers' Union, in securing a price of 54s. a ton for contracts for more than one year so long as the maximum rate of subsidy is payable.

In order to encourage the manufacture in this country of the plant and machinery required for the sugar factories, the Act makes the payment of the subsidy contingent on the Ministry being satisfied that 75 per cent. at least of the plant and machinery must be of home manufacture.

The Ministry is responsible for the administration of the Act and the payment of the subsidy, and accounts of the companies receiving the subsidy have to be sent to the Ministry and laid before Parliament each year. The provisions of the fair wages clause are applied to workers in the factories,

and if any dispute takes place as to wages it has to be referred by the Ministry to the Industrial Court for settlement. The amounts of the subsidy payable by the Ministry are based on certificates of the quantities of sugar manufactured which are supplied by the officers of the Customs and Excise Department who are attached to each factory in connection with the collection of Excise Duty.

The Act has been very successful in encouraging the development of the industry. The acreage of sugar beet has increased from 16,900 acres in 1923 to 130,000 acres in 1926. The number of factories has increased from two to fourteen, and the production of sugar from 13,000 tons to 130,000 tons, which is nearly five weeks' supply for the whole population. The capital invested in sugar factories amounts to over £4,750,000, of which over £1,000,000 has been provided by foreign capitalists, and nearly £2,000,000 has been raised under guarantees given by the Government under the Trade Facilities Act.

It is estimated that on the basis of fifteen sugar factories dealing with the produce of 150,000 acres of sugar beet, the total net cost of the subsidy over the ten years period after deducting Excise Duty will be just under £8,000,000. This is a large sum, but the whole of it will have been spent in employing British labour on the land and in the construction and operation of the factories. If it results in the permanent establishment of the industry in this country it will be the greatest achievement of the State in laying the foundation of a more prosperous agriculture and assisting in the maintenance of the arable area. From the agricultural point of view it

provides a crop which produces more human food per unit of area than any other ; a crop which the farmer can grow under contract, so that he is relieved from any anxiety as to the price he will receive and any necessity to seek a market ; a crop which tends to increase the production of all other crops grown on the land ; and an industry which provides an additional source of employment in the winter months when the labour requirements on the land are at their lowest point.

Flax

Another special crop which the Ministry has endeavoured to assist is Flax. But, unlike sugar beet, it was not a question of establishing a new industry, but of reviving an old one. The growth of Flax for the production of fibre as the raw material for the manufacture of linen is one of the most ancient industries in the world, dating back at least as far as the time of Moses, and at different periods it has been conducted on a considerable scale in this country. In Tudor times Acts of Parliament were passed requiring all persons in occupation of tillage land to devote a specified proportion of it to the cultivation of Flax, and in the eighteenth century the industry was encouraged by an export bounty on British-made linen. At that time Flax was grown in every county in England, and in some areas several thousand acres were devoted to the crop. The introduction of cotton depreciated the value of Flax, but the cotton famine at the time of the American Civil War stimulated Flax production, and in 1870 nearly 20,000 acres were grown in

Great Britain, though part of it was for linseed as a feeding stuff. After that time there was a steady decline in the quantity of Flax grown for fibre and before the War the total acreage in England and Wales was less than 500 acres.

The cause of the decline was partly the competition of imported flax from Russia and Belgium, and partly the fact that the crop is a troublesome one for the farmer to handle if, as was the case, he is expected to undertake not only the growing of the crop but also the after processes involved in deseeding and in separating the fibre from the straw. These processes consisted of retting the straw by soaking it in water to produce fermentation, spreading it out to dry, and then breaking and separating the woody part of the dry straw by a scutching machine to obtain the fibre in a form suitable for sale to the spinners.

The decline of Flax growing is an example of the unfortunate divorce between agriculture and manufactures, which marked so much of the industrial development of the nineteenth century in this country. It was inevitable that the primitive practice of retting and scutching on the farms should disappear, but there was no reason why the raw material should not have continued to be grown, if the industrialists of the linen trade had thought it worth their while to provide for the centralisation of the after processes, instead of taking the easier course of obtaining their supplies from abroad.

The Act which created the Development Fund in 1909 included the preparation and cultivation of Flax among the purposes for which assistance might

be given from the Fund, and the Development Commissioners in conjunction with the Ministry arranged to finance some experiments on a small scale. A report on the possibility of reviving the industry in Great Britain was prepared and published in 1914. The report showed that there was not likely to be any difficulty in raising good crops of Flax, but that the after processes of retting and scutching were outside the province of the agriculturist, and could not well be worked into the routine of farm operations. It was recommended therefore that the after processes should be centralised at experimental factories established for the purpose in suitable districts.

Two experimental stations were established at Selby and Yeovil, and very promising progress was made in the handling of Flax for fibre production. Several improved strains of pedigree seed were evolved, and there seemed every reason to hope that a substantial increase in Flax production would take place. But this experimental work was swallowed up in 1917 in consequence of the emergency of the War. The usual supplies of Flax and Flax seed from Russia and Belgium were unobtainable, Flax was an indispensable War material for the production of aeroplane cloth, and it became of vital importance to develop our own sources of supply. A considerable area of Flax was normally grown in Northern Ireland and could be increased, but the methods of the Irish growers were primitive and they never saved their seed, so that they were dependent on supplies of seed from abroad.

The Ministry was therefore instructed in

December 1917, to arrange for the growth of at least 10,000 acres of Flax in Great Britain, mainly to provide a sufficiency of seed for sowing in Ireland in 1919, and also to supplement the production of fibre. Contracts were made with farmers to grow the crop, the small factories of the Development Commissioners were taken over, other factories were hurriedly improvised in Somerset, Dorset, Northants, Suffolk and Fife, and a miscellaneous army of over 20,000 Boy Scouts, Women, Reformatory boys, City workers and German prisoners was enlisted to weed and harvest the crop. Over 12,000 acres were grown and harvested in 1918. The task entrusted to the Ministry was accomplished, though the cost was colossal. But then came the Armistice. The need was over before the results of all the work could be realised, and the Ministry was left with the problem of carrying on a big commercial enterprise which was no longer required for national purposes. It was decided to dispose of the factories, etc., and they were sold at a heavy sacrifice to three separate Companies, who proceeded to make contracts with the farmers for further crops. The loss to the nation was well over £1,500,000, and it was not long before a heavy slump in the linen trade forced all the Companies into liquidation and the whole industry had to be abandoned.

From the agricultural point of view the rapid expansion of Flax growing during the War was disastrous. It had to be built up with insufficient technical experience at extravagant cost, and its failure and the losses sustained by the farmers and

the factory companies gravely prejudiced the hope of establishing the industry permanently.

At the same time the prosperity of the linen trade is largely dependent upon a larger and more stable supply of raw material, and it is certain that the economic value of the Flax crop can be greatly increased by the use of improved strains of seed which will result in larger yields and better quality fibre.

The Ministry has therefore arranged, in co-operation with the Government of Northern Ireland and the Linen Research Association, for the establishment of a Flax Industry Development Society Limited which has acquired two of the Flax factories near Yeovil mainly to secure the bulking of a particular strain of improved seed, but also to provide facilities for the retting and scutching of the Flax straw grown by farmers, as it would not pay them to grow Flax for the seed alone. The seed produced by the Society, which is a non profit making body, will be placed on the market, and as soon as the scheme has been put on a commercial basis it will be handed over to private enterprise.

It is hoped that the use of this new strain of seed will lead to the re-establishment of Flax growing in this country. The crop is a valuable one from the agricultural point of view, and if the farmer can be relieved of the after processes, and can confine himself to the growth and harvesting of the straw, there is no reason why it should not prove an attractive and profitable addition to his rotation crops.

Tobacco

Tobacco is another crop with which the Ministry

and the Development Commissioners have experimented, but in this case the results have been mainly negative. It cannot be said that there is much hope of establishing the industry in this country, though one gallant grower in Hampshire still perseveres, and obtains a limited sale for his English grown cigarettes and tobacco.

Tobacco was grown in England to a considerable extent in the first half of the seventeenth century, but in 1660 an Act was passed prohibiting absolutely tobacco growing in England, partly on account of the damage that it would do to the Customs Revenue and to the interests of the American Colonies, but also because it was alleged that our climate was unsuitable and that doctors believed that home grown tobacco would be "unwholesome for Men's Bodies." A good deal of surreptitious growing went on, but in time the prohibition became effective, and so far as England was concerned no tobacco was grown till 1886, when permission was given by the Treasury for a limited number of experiments. Most of these experiments were a failure, and as the experts advised that English tobacco could never compete with that grown in warmer climates, the Treasury permission was withdrawn. In 1910, the prohibition contained in the Act of 1660 was repealed, and experiments were allowed on a maximum area of 100 acres, with a rebate of one-third of the Customs Duty, and for the six years 1913 to 1918, assistance to growers up to a maximum of £10 an acre was given by the Development Commissioners. In 1919 the Ministry took over the experimental work, arranged

for the growing of small areas of tobacco on the sandy soils of Norfolk and Suffolk, and provided accommodation and facilities for the curing and handling of the tobacco. The results were disappointing and uneconomic. In 1920 the Ministry purchased 17,000 lbs. from the growers at prices varying from 8d. to 1s. 2d. per lb., but the highest price that could be obtained from the manufacturers for the finished product was 3d. per lb. and the experiments were discontinued after 1921.

At the present time tobacco can be grown by any farmer who conforms to the Excise regulations, and the product obtains the advantage of the preferential rate applicable to Empire tobacco. But English tobacco has a distinctive flavour, which is not appreciated by the ordinary smoker, and, though limited quantities can be blended with imported tobacco without seriously affecting the flavour of the blend, it cannot compete with the imports of Empire tobacco which have been stimulated by the grant of Imperial preference.

The whole question was examined in 1923 by a Committee appointed by the Chancellor of the Exchequer, on which the Ministry was represented. Their report came to the conclusion that even if research and experiment resulted in the production of a better quality of tobacco, it was unlikely that anything more than a low grade article would be produced which could not compete with Empire tobacco without a direct subsidy. The heavy capital cost of curing barns and re-handling depots, estimated at £100 per acre grown, rendered the crop unsuitable for small holders, and the benefit

to agriculture generally would not be commensurate with the cost to the country, which would probably have to be not less than £25 an acre. It was therefore decided that it would not be worth while to stimulate the growth of tobacco in this country at the expense of the general taxpayer.

Rural Industries

One of the results of the industrial revolution and the development of mechanical means of production was the decline of a number of village industries and handicrafts which at one time supplemented to a considerable extent the earnings of the workers on the land. In many cases it would be useless to attempt to reverse this movement, but there are still some industries which are well worth preserving and others that might be revived with advantage. The village blacksmith, wheelwright and saddler are of great value to agriculture, and it would be a serious loss to farmers if their services were no longer available. Further it would increase the resources and interests of country life if the families of the rural population could occupy themselves to some extent in non-agricultural industries in which handiwork is more important than mass production by machinery.

Accordingly the Ministry and the Development Commission have devoted considerable attention in recent years to the problem, as part of the movement to improve the amenities of village life.

The Ministry of Agriculture Act, 1919, contained a provision authorising the payment by the Ministry of expenses incurred by County Agricultural Com-

mittees in making inquiries for the purpose of formulating schemes for the "development of rural industries and social life in rural places," and in a number of Counties Rural Industries Sub-Committees were set up to conduct such inquiries. Soon afterwards the Development Commissioners obtained a report on industries in Rural Districts, and set up a Rural Industries Intelligence Bureau, with the object of providing skilled advice to those engaged in or who contemplated the establishment of commercially profitable rural industries. At the same time a co-operative trading society, known as the County Industries Co-operative Society, was set up to supply workers engaged in rural industries with raw material at wholesale prices and to provide a selling organisation for the products of their work. The Bureau was given a grant from the Development Fund, but the Co-operative Society, being a trading body, is independent of financial aid from the State.

In 1921 the development of rural industries and social life in the country villages was taken up by the National Council of Social Service, a body which had been formed to co-ordinate the work of all the statutory and voluntary agencies engaged in social work, and which had established Councils of Social Service in many urban areas. Under the auspices of the National Council, Rural Community Councils have been set up in a number of Counties, and the Carnegie Trustees have set aside sums amounting to £46,000 to assist their establishment. The Rural Community Councils consist of representatives of the County Councils and of the voluntary associations

concerned with all forms of social work, and the Councils act as co-ordinating bodies for the promotion of adult Education, the development of Rural Industries, the extension of Health Services, the provision of Village Halls, the establishment of Village Social Councils and any other methods which may add to the amenities and interest of country life. At present Rural Community Councils are at work in ten Counties in England and Wales, and others are in process of formation. The Ministry is represented on the Central Committee, and the movement is one which has unbounded possibilities of most useful work. In regard to the development of Rural Industries the Ministry obtained a grant from the Development Fund for the construction of two travelling demonstration blacksmith's Vans, devised by the Rural Industries Intelligence Bureau. These Vans are fitted with oxy-acetylene welding plant, emery grinding and drilling machines, a work bench and suitable tools and are supplied with power from a small oil engine. They are placed in the charge of the Farriery Instructor of the County Council, and are lent to different Counties in turn in order to tour the County and provide instruction for the blacksmiths, so that they may become better equipped for modern conditions. The Vans are also proving of great educational value in convincing wheelwrights, carpenters, etc., of the utility of small power units and efficient mechanical equipment, and should do much to assist in the maintenance of this class of village tradesmen, who are a great asset to agriculture.

The Ministry has also secured for the National

Council of Social Service a grant of £5,000 from the Development Fund in order that loans may be made through the Rural Community Councils for the erection or extension of Village Halls. The loans are made for periods not exceeding five years and are free of interest. As they are repaid, the proceeds are available for the same purpose in other villages.

Women's Institutes

One of the most successful agencies for the development of Rural Industries as well as for other social purposes has been the Women's Institutes, which started in Canada some twenty-five years ago and were introduced in this country in 1915. During the War their establishment was taken over by the Ministry as part of the campaign for increasing food production, and since the War they have been assisted on a diminishing scale by grants from the Development Fund. The Institutes have grown very greatly in number and strength, and they are now one of the most potent influences in the countryside. The number of Institutes has increased from twelve in 1915 to over 3,600 in 1926, and the total number of members exceeds 200,000. The National Federation, which in 1921 received a grant of £10,000, has been so successful in placing the movement on a self-supporting basis that in 1926 the grant was reduced to less than £1,000, apart from a special grant for Handicraft teaching, and there is every hope that the Federation will shortly be independent of State aid. An Endowment Fund of some £17,000 has been established from voluntary contributions.

The grant for Handicrafts, which at present amounts to £1,850 a year, is made to enable the Federation to supply trained teachers available for work in the Institutes and so raise the standard of craft work throughout the movement. Classes are conducted and instruction given in a large number of Rural Industries, such as basket making, glove making, raffia work, leather work, embroidery, upholstery, toy making, weaving, rug making and chair caning, and a Handicrafts Exhibition is arranged each year.

In addition to their work for Rural Industries, the Institutes are active in promoting Music and the Drama in the villages, in providing a centre for educational work of all kinds, and in associating women of all classes in social life and work. The movement is an excellent example of successful organisation, built up on democratic lines of self help with some initial financial help from the State in the early stages.

Chapter XII

THE ECONOMICS OF AGRICULTURE

AGRICULTURE is primarily a business which is carried on with the object of providing a means of livelihood to those engaged in it whether as employers or workers. It is therefore one of the necessary functions of a Ministry of Agriculture to provide information and advice on the economic problems of the industry for the guidance of agriculturists. But in addition to being a business carried on for private profit, agriculture is also a public service. It is concerned with the use for cultivation of the land of the country, one of our greatest national assets, and the nation as a whole is deeply interested in the extent to which the occupiers of its land are contributing towards the food supply of the population. It is expected therefore of the Ministry of Agriculture that in addition to catering for the needs of agriculturists, it should be in a position to supply Parliament and the public with information as to the use which is being made of the resources of the soil.

For both purposes a firm foundation of facts is essential. For many years therefore, even before the establishment of a separate Department of Agriculture, the collection of statistics as to the use of the land has been regarded as a proper subject for the expenditure of public funds.

Agricultural Statistics

Estimates of the acreage of agricultural land, the area under the principal crops and the number of live stock were made by Gregory King and by Charles Davenant at the end of the seventeenth century, and a century later Arthur Young and W. T. Comber both attempted estimates not only of acreage but also of the production of the principal cereal crops. Any attempt however to provide for the official collection of agricultural statistics was resisted on the ground that the information might be used for increased taxation, and it was not until 1866 that arrangements were made for the collection of annual returns of the acreage, cropping and live stock of the country.

The collection of the statistics was made on a voluntary basis, under the supervision of the Board of Trade, by means of returns which the occupiers of land were invited to fill up, stating the acreage, cropping and live stock on their holdings on June 4th each year. Twenty years later, in 1885, annual estimates of the production of the principal crops were instituted.

When the Board of Agriculture was established in 1889, it took over from the Board of Trade the collection and tabulation of the statistics. For many years the distribution and collection of the forms of return made by the occupiers of land was undertaken by the local Excise officers, but owing to the pressure of other duties the Excise Department had to withdraw their assistance, and since 1919 the work has been done by the Crop Reporters of the Ministry of Agriculture, a staff of over 300 part-time

officials, mainly land agents and valuers in private practice, who have a thorough knowledge of the local conditions of their districts.

The annual returns of acreage, cropping and live stock are collected from all occupiers of holdings exceeding one acre, and the total number of returns in England and Wales is over 410,000. Prior to 1917 the return was voluntary, but as the Corn Production Act of that year provided for the payment of a subsidy on the acreage of wheat and oats it was considered necessary to require a compulsory return enforced by penalties. When the subsidy was withdrawn in 1921 the return again became voluntary, but in 1925 the Agricultural Returns Act was passed, which gave the Minister power to require occupiers of agricultural land to make an annual return of the acreage of the various crops, the numbers of the different kinds of live stock and of the persons employed. Under the voluntary regime the great majority of the occupiers recognised the value of the returns and filled up the forms willingly. Less than 3 per cent. of the occupiers in the whole country ever refused to do so, and in those cases the Crop Reporters were able from their local knowledge to supply the information required so as to complete the particulars for the parishes for which they were responsible.

The tabulation of the annual returns made on June 4th by the occupiers of over 410,000 holdings is a big task, which requires the engagement of a temporary clerical staff of some 200 persons for a period of about eight weeks. It is usually possible to issue a preliminary statement giving the total

figures for the whole country of the acreage of crops and the number of live stock by the first week in August.

The main features of the schedules issued to the occupiers of land remain unchanged each year, but from time to time additional items are added in respect of matters which are not sufficiently important to enumerate each year.

The statistics of production from the land are collected not by direct returns from the occupiers, but by estimates made by the Ministry's Crop Reporters. While there is no difficulty in obtaining from occupiers accurate information on easily ascertained facts such as the acreage of their crops and the number of their live stock, it would be far more difficult to obtain from them accurate statements of their production, particularly in the case of crops which are consumed on the holding. Some crops are not usually weighed or measured until they are sold, which may be many months after they are harvested, and the farmer would not be able to supply accurate information of production till then. Moreover it is believed that most farmers have an inherited tendency to under-state the results of their farming which would result in a substantial under-estimate of the total production of the whole country. It is preferable therefore, and also much less expensive, to rely on expert estimates made by the Crop Reporters. Each Reporter is supplied with the acreage of the principal crops in each parish in his district, and he is asked to estimate the yield per acre of each crop in each parish. By this means estimates are arrived

at of the production in some 13,000 separate parishes weighted according to the acreage, and these provide a reliable basis for ascertaining the total production in the country as a whole. In making their estimates of yield the Crop Reporters rely not only on their own observation and knowledge, but also on inquiries from growers, threshing machine owners and valuers. The estimates are made in October for the corn, pulse and hay crops and in November for potatoes and roots.

The Agricultural statistics give particulars of the cropping and production of some 31,000,000 acres in England and Wales out of the total land area of 37,000,000 acres. Of the remaining 6,000,000 acres, about 2,000,000 acres consists of forests and woodlands, and the other 4,000,000 is occupied by the houses and gardens of the towns and villages, by the factories and other industrial establishments and by roads and railways. Holdings of one acre and under are not included in the scope of the agricultural returns, and though their omission leaves out of account a considerable volume of production in such things as eggs, fruit and vegetables it would be impracticable without undue expense to attempt to collect returns of the produce of private gardens, &c. from every householder in the Kingdom.

In addition to statistics of acreage, cropping, live stock and yields, the Ministry has collected since 1904 returns of the prices of agricultural produce through a staff of some fifty Market Reporters, who make weekly returns of the prices realised at a number of representative markets. These prices which are often based on local weights and measures

are converted to a common standard, so that prices in different markets can be readily compared. Index numbers are worked out by the Ministry for each of the principal commodities, expressed as percentages above or below the prices ruling in 1911-1913, which are taken as the base years, and also a general agricultural index number for all commodities, which is weighted to allow for their relative importance. The market prices are published each week in the Ministry's Agricultural Market Report, price 2d. or 10s. per annum post free. In addition to records of prices and supplies, the Agricultural Market Report contains special articles dealing with the supply and price of various products and with general agricultural conditions at home and abroad. The Ministry also prepares a short review of market prices which is broadcast once a week.

Census of Production

In connection with the Census of Production which is taken by the Board of Trade every five years under the Census of Production Act, 1906, the Ministry of Agriculture arranges for a contemporary Return of agricultural output. As agriculture is not prescribed as a trade under the Act of 1906, the information is obtained voluntarily.

The principal object of the Census is to supplement the annual agricultural Statistics with information as to the production not only of the ordinary farm crops but also of milk and dairy produce, meat, wool, poultry and eggs and fruit and market garden produce. Estimates of the production of these

commodities present much greater difficulties than estimates of the production of cereals or roots, and it would be impracticable to attempt to obtain them every year. It is obviously desirable however to obtain periodically a complete Census of Agricultural Production so as to be able to measure the extent to which the land of the country is contributing to the total food supply. Special systems have to be devised to ascertain the output of different commodities. For instance, in the case of meat it is not possible to obtain the information required from the farmers themselves, as most of the cattle, sheep and swine are not slaughtered on the farms. The method adopted is to calculate the number of animals slaughtered for food from the differences in the number of live stock on June 4th as between one year and another, allowances being made for births and deaths during the twelve months, particulars of which are obtained from the farmers. The production of meat is then calculated on the basis of the average dressed carcase weight of meat which the number of animals slaughtered are assumed to yield. The average carcase weight is calculated from a large number of returns obtained from butchers all over the country in respect of the different classes of animals.

International Institute of Agriculture

An important source of information on agricultural statistics and economics is the International Institute of Agriculture in Rome. The Institute was established in 1905 on the initiative of the King of Italy, who provided it with a fine building in the Borghese

Gardens and also a nucleus endowment fund. The Convention establishing the Institute has received the adherence of over seventy Governments representing practically every country in the world. Great Britain, as well as the British Dominions and India, has taken an active part in the work of the Institute, and the Ministry has co-operated in many directions, particularly in the development of its statistical work.

The Institute collects agricultural statistics from all parts of the world and publishes an International Year Book of Agricultural Statistics as well as periodical reports on Crops and Crop Prospects, which are of considerable value in connection with the international trade in agricultural products. The Institute also publishes a quarterly Review of Agricultural Economics.

The income of the Institute is derived from contributions from the adhering Governments based on a unit of 12,500 lire per annum. Governments in Class I pay sixteen units or 200,000 lire and are entitled to five votes on the Governing Bodies. All the important countries are in Class I and the smaller countries which are in other classes pay a lesser number of units of subscription and have fewer votes. The Institute is governed by a Permanent Committee, which meets monthly in Rome, on which the adhering Governments are represented, and once every two years there is a General Assembly to which most of the Governments send a special delegation, at which the work and organisation of the Institute is reviewed.

The Ministry is co-operating with the Institute

in the arrangements for a World International Census of Agriculture, which is to be taken in 1930-1931, towards the cost of which a generous contribution has been made by the International Education Board of America, founded by Mr. Rockefeller.

Research in Agricultural Economics

Success in agriculture is largely dependent on the adoption of sound methods of farm management, proper organisation of labour, close attention to costs and careful study of markets. It is useless to grow crops or raise live stock that will not pay the cost of production, and it is axiomatic in agriculture that high farming is no remedy for low prices. It is necessary therefore to provide for a systematic study of the business side of agriculture and for this purpose the Ministry, in co-operation with the Development Commissioners, established in 1913 an Institute for Research in Agricultural Economics in connection with the University of Oxford.

Accurate accounting is the basis of all successful business and the Oxford Institute has therefore concentrated on a study of the application to agriculture of the systems of cost accounting which are in common use in other industries. An ordinary mixed farm is a combination of so many different enterprises all closely interwoven that it is a matter of special difficulty to arrive at a satisfactory method of ascertaining the cost of production of separate crops, etc. Moreover full cost accounting on a farm would be beyond the resources of an ordinary farmer. The Institute has therefore undertaken the compilation of cost accounts for a limited

number of farms, while at the same time a simpler system of financial accounts has been devised for the use of farmers themselves. These financial accounts assist farmers to ascertain the main factors which influence the profit or loss shown, and indicate the directions in which alterations or improvements should be made. The full cost accounts are intended to serve a wider purpose. They are designed to collect data to test the efficiency of farm management in regard to the investment of capital, the employment of labour and the utilisation of the land, for the benefit of the industry as a whole and for the information of Parliament and the public.

The Institute is also carrying out a general agricultural survey based on data collected from some 1,500 farms. This Survey is designed to collect information on the economic problems of farm management and is being carried out by the issue to each occupier of a schedule which he is asked to fill up, which is followed up by a visit from members of the staff of the Institute. They assist the farmer to complete the schedule and obtain such other information as they are able and the records are then taken to Oxford for tabulation and analysis. From this material, statements are prepared showing, for example, the value of the production per acre for farms of various sizes; the influence of the type of farm on the labour requirements; the influence of the size of the holding on labour efficiency; the relation of crop yield to the rent of farms; and the influence of the type of farm on the use of manures. A survey of this kind throws light on many important economic aspects of agriculture, some of them

questions which often form the subject of political controversy, such as the most efficient size of farm for a particular kind of farming, and others of great value for advisory and educational purposes.

Local investigations into agricultural Economics are conducted by a staff of Advisory Economists, paid by the Ministry, one of whom is attached to each of the advisory Centres in England and Wales, and whose work is co-ordinated through the Oxford Institute. The Advisory Economists assist in the compilation of cost accounts, and advise farmers on the principles of agricultural book-keeping, the cost of production of various crops, the output of man and horse, etc. In one area an Agricultural Accounting Society has been formed for the purpose of collecting simple financial accounts for investigation from the point of view of efficient farm management. Reports on the result of the investigation are supplied to the members of the Society, who are thereby assisted to detect the weak spots in their methods and to develop their business along the most profitable lines.

The Marketing Problem

It is generally recognised that there is room for great improvement in the methods of marketing British agricultural produce. There is in many cases an undue disparity between the prices paid by the consumer and those received by the producer. Farmers are in some respects too much at the mercy of the distributive organisations, and they are often not sufficiently alive to the importance of studying their markets and presenting their produce for

sale in the form which will best appeal to the taste of the British public. They are also exposed to severe competition from the agricultural products of the whole world, the prices of which are fixed by world conditions over which they have no control.

The problem is one of peculiar difficulty in a country which is so largely dependent as Great Britain on imported food. Countries with an export trade in agricultural produce must necessarily organise the transport and delivery of their products on a large scale, and there is therefore a powerful incentive to collective action on the part of the producers. Moreover it is easy to enforce standardisation and grading. A Dominion or Foreign country which desires to supply the British market aims at supplying goods of uniform quality, and products which do not reach the required standard are not allowed to be exported and must be consumed at home. The result is that the British farmer is faced with the competition of a steady flow of goods of uniform quality in a form which the merchants and retailers can handle with confidence and convenience, while he has to dispose in the same market of very varying qualities of produce, much of which is only available at certain periods of the year.

It is often said that the solution is to be found in the co-operative organisation of producers, but co-operation is a plant of slow growth on English soil. Farmers as a body rather enjoy the marketing side of their business, and those of them who are shrewd business men can do well at it, largely because of the lack of organisation and business

methods of their less competent fellows. Such men do not see what they have to gain by aggregating their produce for sale purposes with the perhaps inferior produce of their neighbours, and the average farmer will not welcome with any enthusiasm a proposal that the sale of his produce should be taken out of his hands and conducted for him by the manager of a co-operative society. Attendance at markets one or twice a week may be the cause of wasting much time which could more profitably be applied on the farm, but many men would object strongly to giving up a practice which adds zest and variety to their life.

The preacher of co-operation must therefore not expect a very fruitful response from the rank and file of farmers, and it must be admitted also that the manner in which the gospel has been presented has not always been best calculated to commend it to an agricultural audience. Farmers are perforce stern realists, and they have little use for idealistic theorists, however public spirited and enthusiastic, who preach doctrines unrelated to practical experience.

At the same time it cannot be denied that in a world which is increasingly dominated by large scale organisations, an industry like agriculture, composed of a large number of small capitalists, must suffer if there is no collective action among its members. Accordingly for many years the Ministry has sought by various means to promote the better organisation of the industry, both in regard to the purchase of its requirements and to the sale of its produce.

For a considerable period the work of promoting agricultural co-operation was undertaken by the Agricultural Organisation Society, a voluntary body supported to a limited extent by private subscriptions and affiliation fees paid by its associated societies and assisted by considerable grants from the State. In the fifteen years from 1910 to 1924 grants amounting in all to nearly £200,000 were made to the Agricultural Organisation Society by the Ministry. Though an immense amount of energy and public spirit was displayed by those responsible for the operations of the Society, the results achieved were disappointing. The movement as a whole was somewhat out of touch with ordinary farming practice, and it was generally regarded as an attempt by the State to impose on farmers methods of doing business which they were not convinced would be to their advantage. The essence of true co-operation is self help, and so long as the farming community felt that co-operation was a State enterprise and not a movement for which they themselves must take responsibility, there was no hope that it would be generally adopted.

At the same time some measure of success was achieved. In regard to the co-operative purchase of requirements, such as fertilisers, feeding stuffs and seeds, societies were formed all over the country, whose annual turnover in 1924 was over £8,000,000, and it was estimated that one English farmer in four was associated in some manner for the purchase of requirements. On the other hand, the co-operative sale of produce, which is more difficult and more important, made much less headway. The

total sales of marketing societies amounted to less than £5,000,000 per annum, or not more than 3½ per cent. of the total value of agricultural produce marketed in England and Wales.

In 1924 a distinct change of policy was decided upon. The system of subsidising a voluntary Society, which was not really representative of the farming community, was terminated, and the Agricultural Organisation Society was informed that it could look for no further assistance from public funds. This decision was influenced not only by the belief that State endowment would hinder rather than help the acceptance by farmers of co-operative methods, but also by the fact of the existence and development of the National Farmers' Union. When the Agricultural Organisation Society was established farmers had no national organisation of their own. But since then the National Farmers' Union had been established, had grown with remarkable rapidity in influence and numbers, and had become one of the most representative and well organised bodies in the Kingdom. In such circumstances it was clear that if co-operation was ever to become a farmers' movement, organised and controlled by the farmers themselves, the National Farmers' Union was the only body capable of undertaking the work. The Agricultural Organisation Society was therefore wound up, its records were transferred to the National Farmers' Union, and the Union set up a Co-operation Committee which undertook the business of registering and assisting Agricultural Co-operative Societies.

As a result of the great slump in agricultural

prices which began in 1921, many Societies became involved in serious financial difficulties, which caused a set back to the whole co-operative movement. The efforts of the National Farmers' Union have been largely directed to consolidating the position ; it has refrained from starting new enterprises unless it was satisfied that they could be established on a firm business foundation. The Union is gradually developing the economic side of its work, has made successful efforts to organise collective bargaining for the sale of milk and of sugar beet under contract, and has also assisted in drawing up a co-operative scheme for the collective sale of English hops, which has obtained the adherence of growers representing over 90 per cent. of the hop acreage. The Union has also conducted a thorough investigation of the economic position of the co-operative bacon factories and has published a report on the subject.

In view of the mistakes and failures of the past, it is inevitable that progress in co-operative organisation will be slow, but farmers and their organisation are increasingly alive to the importance of the marketing problem, and now that the work is in responsible hands there is every assurance that development, if slow, will be on sound lines.

It has too often been assumed that the economic problems of agriculture in this country can be solved by exactly the same methods as are adopted in other countries. But this assumption ignores the fundamental difference between a country like ours, highly industrialised and with a population

dependent for half of its food on imported supplies, compared with countries with a large export of food, or where agriculture is not subordinated to industry and the standard of life of the workers is much lower. Britain is the market for the agricultural products of the whole world, and to it is directed every variety of produce, much of which is standardised and graded under the auspices of the Governments of the exporting countries and handled in bulk by large firms of importers. On the other hand home produce is marketed individually in small quantities with little or no uniformity of grade or packing. Consequently, while the British producer has the best market in the world at his door, he too often fails to secure an adequate proportion of the ultimate price at which his produce reaches the consumer. It is obviously no easy matter to alter traditional methods of long standing, under which powerful vested interests have grown up, and to substitute more orderly methods of marketing. It would be useless to attempt to enforce statutory methods of control in advance of farming opinion, and in these circumstances the policy of the Ministry is to proceed by methods of investigation and education. Before remedies can be suggested, the whole problem has to be studied and investigated, the facts of the situation must be ascertained, experiments carried out and demonstrations made.

Accordingly the Ministry has devoted special attention in recent years to a thorough investigation of the conditions under which home agricultural produce is marketed, and of the markets themselves.

A series of Economic Reports have been published dealing with the marketing of Eggs, Poultry, Pigs, Potatoes and other commodities, and it is proposed to deal with the whole range of agricultural produce. The Reports not only contain descriptive accounts of the methods employed and of the services rendered at each stage of the marketing process, but also discuss means by which existing methods may be improved. The attention of farmers is thus called to the weaknesses of the present position and the importance from their own point of view of adapting their business methods to modern conditions. The lessons brought out by the Reports are being illustrated by exhibitions and demonstrations, which spread among farmers generally a knowledge of the methods of grading, packing and preparation for market, which will enable them to get the best possible price for their produce.

The development of this work has been greatly assisted by funds provided by the Empire Marketing Board, which was established to administer the fund of £1,000,000 a year which was set aside by the Government to assist the marketing of Empire produce. In the first instance the scope of the fund was confined to the marketing of produce from the overseas parts of the Empire, but it was later agreed to include home produce, and the Ministry is now represented on the Empire Marketing Board. The Board has agreed to make a grant of £40,000 a year for five years, to meet the cost of the staff engaged in the investigation of the marketing problem and of experiments and demonstrations of improved methods of marketing.

Credit

One of the most important factors in the economics of agriculture is the provision of adequate credit facilities. It must be admitted, however, that no complete solution of the problem has yet been found though several attempts have been made to deal with the question in different ways.

Agriculture, unlike other industries, has not made use of joint stock methods of raising the capital it needs, and the industry has been carried on in the main by using the personal capital of the individuals engaged in it, rather than by inviting the general public to invest their savings in it. The fixed capital represented by the value of the land and the buildings and other permanent improvements upon it has been supplied by the landowners on easy terms, and the working capital needed for the cultivation of the land has been provided by the tenant farmers. So long as the traditional system of landlord and tenant was in full operation, it worked well. The rents paid represented only a very modest return on the landlords' capital, but the ownership of agricultural land had attractions apart from the financial return and landowners did not regard their properties as commercial investments. So long also as there were a sufficient number of tenant farmers possessed of adequate capital for the proper cultivation and stocking of their farms, there was no particular necessity to consider whether any action was required on the part of the State.

In recent years however the position has changed. The increased burden of taxation has forced many of

the old race of landowners to sell their estates, and those who are left find themselves each year less able to expend money on permanent improvements. At the same time successive Agricultural Holdings Acts have increased the amount which has to be found by an incoming tenant on taking a farm and the increased cost of labour and requirements has added to the working capital required for cultivation and stocking. There is therefore an increasing demand for long term credit for the purchase of land and the execution of permanent improvements, and for short term credit for the seasonal requirements of the farm for producing and marketing the crops and stock.

This country has no standard machinery of long term agricultural credit of the kind which is common in almost every other civilised country in the world. Other countries provide credit facilities based on farm mortgages repayable within a definite period by regular instalments of principal and interest. Here mortgages can be obtained but they are not granted for a definite term of years, they may be called in at any time on short notice, and there is no uniform method of redemption. The result is that a farmer who purchases his farm, and borrows money on mortgage to pay part of the purchase price or to raise capital for improvements has no security that the loan will not be called in and no easy method of reducing his indebtedness. This has a detrimental effect on production and discourages the flow of capital to the land. To a certain extent capital for land purchase can be obtained by borrowing from the Banks but, though a considerable

amount in the aggregate is provided in this way, such Bank loans are usually only made for short periods pending the time when an ordinary mortgage can be effected. In these circumstances the proposal has been mooted in a report issued by the Ministry that a Central Land Bank should be established, the object of which would be to make long term mortgage loans through the Joint Stock Banks and their branches, and to raise money for the purpose by the issue of debentures to the public.

Short term credit for working capital is provided to a considerable extent by the Banks and by agricultural merchants on the personal security of farmers. It is often stated that the absorption of the old country Banks in the large Joint Stock Banking amalgamations centred in London has reduced the facilities for Bank credit which farmers were accustomed to receive from the country bankers to whom they were personally known. It is doubtful however whether this is really the case. There is keen competition for business among the great Joint Stock Banks, who have branch offices in every market town, and most farmers of reputation and standing can obtain seasonal overdrafts from the Banks with which they deal. There is also a considerable amount of accommodation granted to farmers by corn and manure merchants and by auctioneers in the shape of credit for their purchases of feeding stuffs, seed, manures and live stock until they are able to realise their produce. This form of credit is however open to the objection that it tends to hamper the farmer's freedom of marketing, and that he does not realise what it costs him.

While the larger farmers are fairly well provided with facilities for short term credit, this is not always the case with the small holders and young men who are taking farms for the first time. For the benefit of such men attempts have been made to establish a system of co-operative credit, such as is in operation with great success in many Continental countries. For many years before the War the Agricultural Organisation Society endeavoured to form Co-operative Credit Societies on the same lines as the Raiffeisen Banks in Germany, based on the unlimited liability of all the members. Little or no success was attained. The number of Societies in operation in 1913 was only thirty, with under 800 members, and the total amount of loans granted amounted to less than £2,000. It was evident that the principle of unlimited liability was alien to the British character and the Societies also failed to attract deposits from their members. In these circumstances the Board of Agriculture drew up Model Rules for a new form of Co-operative Credit Society with the liability of its members limited by shares, and arrangements were made with the Joint Stock Banks, under which they agreed to assist such Societies with advice in connection with book-keeping and audit, and promised to give favourable consideration to applications for advances at a reasonable rate secured on the joint liability of the members. This scheme also made no headway, and a further attempt to establish co-operative credit was made in 1923 under the Agricultural Credits Act of that year. That Act provided that a Co-operative Credit Society could obtain from the

Ministry an advance equal in amount to the share capital of the Society of which only 5s. in the £ need be paid up. The advance from the Ministry would bear interest at current bank rate, with a minimum of 4 per cent., and the loans made by the Society to its members could therefore usually be made at one per cent. above bank rate. The terms under which the State was prepared to assist Co-operative Credit were therefore particularly favourable, but in spite of them very little advantage has been taken of the facilities and that part of the Act of 1923 has proved a dead letter. The fact seems to be that the idea of Co-operative Credit is wholly alien to the psychology of the British farmer. He is a strong individualist and he particularly dislikes having to disclose his financial position to his fellows. Moreover the fact that most substantial farmers can obtain the credit they need for themselves means that the men who would take advantage of any State-assisted form of Co-operative Credit are mainly the lame ducks of the industry. In this country the Banks are so strong, so well organised and so widely distributed that the position is completely different from that in most Continental countries, where there were no institutions in existence prepared to finance agriculture and where the existence of a race of peasant proprietors afforded a firm basis of security for co-operative credit. The difficulty in this country under the landlord and tenant system is that while farmers have property in their crops and stock it cannot be pledged as security for a loan except by a registered Bill of Sale. There is no inherent reason why a Bill of

Sale should not be used as a basis for credit, but it has acquired a bad name, and in practice a Bill of Sale has become the last resort of financial embarrassment and its use destroys rather than facilitates credit. In order to get over this difficulty it has been suggested that a special form of agricultural chattel mortgage should be legalised.

In order to assist the development of co-operative enterprises in agriculture a sum of £200,000 was voted by Parliament in 1924 to enable the Ministry to grant loans not exceeding £10,000 in any one case to registered societies engaged in the preparation and marketing of agricultural produce, such as bacon factories and milk depots. The loans, which normally must not be more than half of the capital of the Society, are usually secured by a first charge on the assets of the Society and are repayable within twenty years. The rate of interest is 5 per cent. and in certain cases the loans may be made free of interest for the first two years. The loans are made on the recommendation of the Ministry's Advisory Committee on Co-operation and Credit and the books of the Societies are open to inspection by the Ministry at any time.

Chapter XIII

TITHE, COPYHOLDS, INCLOSURES, COMMONS, GLEBE LANDS AND UNIVERSITY AND COLLEGE ESTATES

THE oldest duties of the Ministry are those relating to Tithe Rentcharge, which it has inherited from the Tithe Commission established under the Tithe Act, 1836. From as early as the fifth or sixth century the payment of tithes for the support of the Church was enjoined as a Christian duty, and soon after it was enforced by the sanction of ecclesiastical law. In course of time, probably by the eighth century, it had become a legal obligation in this country, the payment of which was enforced by the State.

The tithes originally represented the tenth part of the increase arising each year from the profits of lands, including the live stock upon it, but in course of time it became customary to pay a tenth of the actual produce irrespective of profits. For many centuries tithes were paid in kind, i.e. the clergy took the tenth sheaf of corn, the tenth sack of potatoes, the tenth calf and the tenth pig and so on throughout the whole range of titheable produce. Reminders of this practice exist in the shape of the fine Tithe barns still to be found in many parts of the country, in which the parson's share of the produce of the village farms was stored.

Most tithes originally belonged to the Rector of the parish, but in course of time many rectories became annexed to bishoprics, deans and chapters or monasteries, who appointed a Vicar to minister to the spiritual needs of the parish and allotted to him a portion of the revenues of the parish. At the Reformation, when the property of the monasteries was alienated, the tithes formerly payable to them were in many cases granted by the Crown to laymen who became known as lay impropriators, and in other cases grants were made to Colleges and Schools.

Collection of tithes in kind was obviously inconvenient, and, long before any general commutation, arrangements were made in certain cases by agreement between a parson and his tithe-payers for the payment of a fixed sum of money, known as a modus, in lieu of tithe. An objection to this practice was that any fixed money payment is liable to great fluctuations in purchasing power, and in point of fact these moduses, which were often not more than twopence per acre, have proved to be a very bad bargain for the clergy.

When the general commutation of tithes was carried out in 1836 a different method was followed. In order to preserve, as far as possible, the purchasing power of the property, it was prescribed that the tithes should be converted into tithe rent-charges, the amount of which should vary with the varying price of corn. The actual sums payable therefore varied each year, and up to the time of the Great War the system worked well on the whole, and secured to the tithe-owners a revenue appropriate to the current cost of living. The tithe-payers also

benefited in that their payments varied up or down according to the prosperity or otherwise of the agricultural industry, though when the liability for the payment of tithe rentcharge was transferred in 1891 from the occupiers of the land to the owners the benefit became less direct.

The principal duties of the Tithe Commission and its successor the Ministry of Agriculture since the commutation have been to carry out redemptions, altered apportionments and mergers of tithe rentcharge.

Several Acts of Parliament were passed with the object of facilitating the redemption of tithe rentcharge, and indeed of compelling it in the case of tithe rentcharges not exceeding 20s., or charged on land which has been so divided that no further apportionment could conveniently be made, and also in the case of land acquired for certain public purposes. But the payment for redemption had to be not less than twenty-five times the par value of the rentcharge, and as the fall in the prices of corn reduced the annual value of tithe rentcharge considerably below the par value, the terms of redemption became onerous, and little advantage was taken of them.

In 1918 fresh legislation was passed with the object of further facilitating the redemption of tithe rentcharge, and also of stabilising its value for a limited period. Owing to the rise in the prices of corn in consequence of the War the value of tithe rentcharge was increasing considerably. Whereas in 1914 it had been £77 1s. 4d. for each £100 commutation value, it had risen to £109 3s. 11d.

in 1918, and under the operation of the septennial averages it would have risen to nearly £124 in 1919 and to over £140 in 1920. So great a rise would have been a serious burden on the land, and the authorities of the Church expressed their unwillingness to receive so large an increase as a result of the War. Accordingly the Tithe Act, 1918, provided that for a period of seven years from 1918, the value of tithe rentcharge should be fixed at £109 3s. 11d. per cent., and in return for this it was enacted that after January 1st, 1926, the value of tithe rentcharge should be ascertained by the average prices of corn for the previous fifteen years, instead of for the previous seven years.

The Act also allowed tithepayers to redeem tithe rentcharges during a period of two years after the passing of the Act on exceptionally favourable terms, viz., for twenty-one times the par value, and provision was also made for the redemption to be effected, if desired, by an annuity spread over fifty years, instead of by a capital sum. After the expiration of the period of two years, the terms of redemption were less favourable to the tithepayers and were based on the payment of such sum as would produce for the titheowner an income equivalent to the perpetuity value of the tithe rentcharge, less the average deductions for rates, land tax and cost of collection.

These provisions stimulated considerably the process of redemption, though their operation was checked to some extent by a measure of relief in respect of the rates on clerical tithe rentcharge granted by Parliament in 1920, which had the effect of increas-

ing the cost of redemption. Whereas prior to 1919, less than £74,000 of tithe rentcharge had been redeemed in eighty years, in the seven years 1919 to 1925 inclusive over £380,000 of tithe rentcharge was redeemed through the Ministry. This involved the collection by the Ministry of a sum of nearly £4,000,000, mostly in small amounts from a very large number of separate owners of land, without taking account of the redemptions effected by annuities amounting to over £170,000 a year.

This work involved the employment of a large staff, but about five-sixths of the cost of it was recouped by the fees charged by the Ministry, which were added to the redemption money payable by the owners of land. The redemption monies in the case of clerical tithe rentcharges are paid over by the Ministry to Queen Anne's Bounty for investment on behalf of the benefice, and in the case of lay tithe rentcharge they are paid to the owners of the tithe rentcharge.

In 1925 further legislation was passed in view of the expiration of the provisions of the Act of 1918 in regard to the temporary stabilisation of the value of tithe rentcharge. Owing to the operation of the fifteen years average of the prices of corn the value of £100 of tithe rentcharge would have risen to £131 in 1926, and to a somewhat higher figure in subsequent years till 1930, when it would probably have begun to fall. So large an increase would have been difficult to collect, particularly at a time when the prices of agricultural produce were low, and it was decided therefore to stabilise the value of tithe rentcharge in perpetuity, to transfer all ecclesiastical

tithe rentcharge to Queen Anne's Bounty, and to provide for its redemption by means of an annual sinking fund.

The Act fixed the stabilised value of all tithe rentcharge at 105. In the case of ecclesiastical tithe rentcharge an annual sinking fund of £4 10s. is payable in addition, which will extinguish clerical tithe rentcharge in 85 years and tithe rentcharge attached to ecclesiastical corporations in 81½ years. At the same time the opportunity was taken of dealing with the vexed question of the rates on ecclesiastical tithe rentcharge, by providing for a contribution in respect of rates of £5 out of each £105 of tithe rentcharge attached to benefices and of £16 in the case of tithe rentcharge belonging to ecclesiastical corporations. Lay tithe rentcharge is left liable to rates in the ordinary way. Thus for every £100 of commuted tithe rentcharge, beneficed titheowners will receive £100 free of rates, ecclesiastical corporations will receive £89 free of rates, and other titheowners will receive £105 subject to rates, which on the average will give them a net sum of about £71.

At the end of the sinking fund periods ecclesiastical tithe rentcharge will disappear, after a life spread over many centuries and marked by many controversies. The Tithe Act of 1925 is therefore a landmark in the relations of the Church of England with the State.

In the meantime however, the Ministry remains responsible for carrying out redemptions for cash of both ecclesiastical and lay tithe rentcharge, as well as altered apportionments and mergers. Any

person who owns both tithe rentcharge and the land charged with it can extinguish the tithe rentcharge by a deed of merger approved by the Ministry, and since 1838 nearly 20,000 mergers have been so approved, involving the extinguishment of £192,000 of annual tithe rentcharge. During the same period over 17,000 separate instruments of altered apportionment have been made, whereby the tithe rentcharge on lands which have become divided in ownership has been re-apportioned, so that a separate charge is placed on the land of each owner.

The Ministry is responsible for the custody of the original Tithe Apportionments and Maps in respect of 11,787 separate parishes, and these are annotated to show any of the tithe rentcharges that have been redeemed, merged or re-apportioned. These documents are open to inspection on payment of a fee of 2s. 6d., and some 3,000 or 4,000 inspections are made each year. The total number of tithe documents in the custody of the Ministry is over 150,000, and, apart from their legal importance as the title deeds to property of the value of over £50,000,000, they are of considerable historical interest as a record of the greater part of England and Wales in the early years of the Victorian era. They show the names of the owners and occupiers of the land with the name, description, area and in most cases the state of cultivation of each separate field or other enclosure.

Copyholds

Another venerable relic of ancient days with

which the Ministry has had to deal is the enfranchisement of land held on copyhold tenure. This form of tenure probably originated before the Norman Conquest, but it became part of the feudal or manorial system and in the sixteenth century one third of the land in England was copyhold. A copyholder was a tenant of a manor who held his land at the will of the lord according to the custom of the manor, and his title was evidenced not by deeds in his own possession, but by the records of the Manorial Court. He was therefore said to hold "by copy of court roll." He was debarred from some of the rights of absolute owners, such as cutting timber and opening mines. He often had to pay an annual quit rent to the lord of the manor, and if he desired to dispose of his land to a purchaser a fine was payable to the lord on the admittance to the court roll of the new copyholder. On the death of a copyholder, the lord again levied a fine, which might amount to two years' value of the land, as the price of admittance of the heir, and he might also seize the best beast or chattel as a heriot.

The archaic incidents of copyhold tenure proved highly inconvenient, and consequently the manorial rights were in many cases extinguished by agreement and the land became freehold. A long series of Acts beginning in 1841 have been passed to enable both lords and tenants to require and compel the enfranchisement of copyholds, and these have been administered by the Ministry and its predecessors. Under these Acts the Ministry has had the final responsibility of determining the compensation for

enfranchisement, in default of agreement between the parties, and the award or deed of enfranchisement had to be made or confirmed by the Department.

But this is now ancient history. From the 1st January, 1926, all copyhold land became automatically enfranchised in accordance with the provisions of the Property Acts 1922 to 1924. The land will continue to be subject to the manorial incidents for a period of ten years from the 1st January, 1926, after which they will be extinguished by lapse of time, unless steps are taken to extinguish them by compensation in accordance with the scales prescribed in the Acts.

It is estimated that there are not less than half a million separate tenements in the country which were held on copyhold tenure and have been enfranchised by the Property Acts. The total compensation payable in respect of the manorial incidents may amount to as much as £50,000,000. In the great majority of cases it is probable that agreements will be arrived at and the question settled without reference to the Ministry, but those cases where agreement is not reached will have to be determined by the Ministry and this may involve a considerable increase of work of a highly technical and complicated character.

Inclosure and Commons

One of the duties of the Ministry which has practically come to an end is the supervision of the inclosure of lands subject to common rights. In early days a very large proportion of the land of the

country was commonable in one form or another, but throughout the centuries there has been a continual process of conversion from communal use to individual ownership. In the ancient village community, which was a primitive form of agricultural co-operation, the land was cultivated by an association of partners who jointly regulated the use to which the land was put. Apart from the demesne of the lord of the manor, which was private property, the remainder of the land was usually divided into three categories, all of which were subject to certain common rights. These three classes were the open arable fields, the meadows and the waste of the manor. The open arable fields were divided into two, three or four approximately equal portions, and cultivated according to rigid customary rules. Each portion was divided into strips of from a quarter of an acre to an acre and the members of the village partnership held one or more strips in each field. The holdings would be of varying size and in order that each occupier might have a fair proportion of the best and of the worst land the strips in each field were intermixed. Thus if the holding of one of the occupiers in a three field village amounted to thirty acres he would have ten acres in each field, but each ten acres would be scattered, and might consist of fifteen or twenty separate strips intermixed with the strips of other occupiers. The strips in each field had to be cultivated in the same manner, and a three course rotation was common. One field would be cultivated for wheat or rye, another for barley, oats, beans or peas and the

third would lie fallow. From seed time to harvest the cultivated fields were fenced against live stock, but after harvest the fences were removed and the fields were thrown open to the live stock of the community for common grazing.

The use of the meadows was allotted to the occupiers of the open arable fields, each of whom received a portion which he could put up for hay for his individual use. After hay harvest the meadows were open for common pasturage.

The waste of the manor, which was uncultivated land, was available at all times for common pasture of the live stock belonging to the occupiers of the open arable fields and of cottages to which common rights were attached. The waste also provided the commoners with fern or heather for litter or thatching, and with furze, turf or wood for firing.

This system, while it had many advantages for the poorer classes in the villages, almost all of whom had some interest in the land and were able to keep live stock of their own, obviously had many inconveniences. Much time was lost by the cultivators owing to the scattered character of their holdings, agricultural development was impeded by the necessity of common consent for any change of cultivation, the introduction of roots, clover and artificial grasses was impracticable so long as common grazing was allowed on the arable fields for part of the year, disease was more liable to spread among stock on commons than on inclosed land and improvement of breeds was difficult. It was inevitable that the system could not survive as the

population of the country increased and a greater production of food became essential.

In the eighteenth century Parliament stimulated and encouraged inclosure in order to meet the increasing demands of the industrial population for bread and meat, and the process was essential for the support of the country during the Napoleonic Wars. Without inclosure the necessary increase in the output of agricultural produce could not have been secured, and it made possible the great agricultural development which is associated with the names of Townshend, Bakewell and Coke of Holkham. But on the other hand the Parliamentary Inclosures which completed the process of transferring the land from communal use to individual ownership ignored all interests except legal rights, and large numbers of the rural population who had enjoyed common rights were deprived of them. Even the small occupiers whose rights were recognised by the grant of land were crippled by the heavy costs, and were tempted by the larger owners to sell their holdings. In the words of Arthur Young, who was a great advocate of inclosure, "By nineteen Inclosure Acts out of twenty the poor are injured—in some grossly injured. The poor may say and with truth: 'Parliament may be tender of property. All I know is, I had a cow, and an Act of Parliament has taken it from me.'"

The inclosures of the seventeenth and the early part of the eighteenth century were in the main carried out under private or local Acts of Parliament, under which commissioners were appointed to divide and allot the land, and enabling a specified

majority of the commoners to bind them all. From 1760 to 1815 nearly 3,000 separate Inclosure Acts were passed under which from 4,000,000 to 5,000,000 acres of waste and of open fields were inclosed.

In 1845 a general Inclosure Act was passed which set up a body of Inclosure Commissioners with power to frame Provisional Orders for inclosure, so as to obviate the delay and expense involved in obtaining a special local Act of Parliament in each case. The Act, while intended to facilitate the process of inclosure, contained a statutory recognition of the claims of those classes of the rural population who could not prove any legal rights of common, though they might in fact have enjoyed them, and were certainly prejudiced in their opportunities of advancement by the abolition of the commons. This recognition took the form of a provision that required the Commissioners to provide, as a condition of the inclosure of wastes, for the appropriation of field gardens or allotments for the labouring poor, and of land for the purposes of exercise and recreation for the inhabitants of the neighbourhood. The administration of this provision however was not generous. Between the years 1845 and 1869, 615,000 acres of land subject to rights of common were inclosed under orders approved by the Inclosure Commissioners and confirmed by Parliament, but less than 4,000 acres were set apart for public purposes, namely 2,200 for allotments and 1,742 for recreation grounds. Moreover the plots selected were often the least suitable for the purpose and were situated too far

from the villages to be of any real value to the inhabitants. The policy of inclosure was still too much dominated by a strict legal interpretation of the rights of private property, and the attitude of the larger farmers was shown by their description of the recreation grounds as "ruination grounds" whereby the youths of the villages were tempted to forsake work for games.

On the other hand the Inclosure Commissioners in their report for 1876 claimed credit for the fact that 600,000 acres of common land had been divided up among 26,000 separate owners, that 2,000 miles of new public roads had been constructed, and that an extent of land equal to that of a county had been redeemed from common and waste and divided among a far larger and more varied body of landowners than that of any county in England.

The Inclosure Acts were based on the belief that the inclosure of commons was essential to the economic development of the land of the country, but soon after the middle of the nineteenth century a different view began to be adopted. The use of the land for the production of food had to give way to its use for exercise and recreation, and the private interests of the owners of the soil were subordinated to the demands of the general public. The Metropolitan Commons Act, 1866, forbade the inclosure of any commons within the Metropolitan Police District and thereby put a stop to attempts which were being made by Lords of the Manors to enclose such open spaces as Hampstead Heath, Wimbledon Common and Epping Forest. The Act provided however that in place of

inclosure a scheme might be made placing the common under the control of a local authority or a body of elected conservators with power to make byelaws for the regulation and management of the common and to execute works for its protection and improvement.

This new policy in regard to commons was extended by the Commons Act, 1876, to commons outside the Metropolitan area and though the Act did not expressly prohibit inclosure of such commons it declared that inclosure should not be carried out unless Parliament was satisfied that it would be of benefit to the neighbourhood as well as to private interests.

The area of common land in England and Wales was estimated in 1874 to be not less than $2\frac{1}{2}$ million acres and since that date only about 30,000 acres have been inclosed, nearly all of which was open arable fields. Under present conditions it is only in very exceptional circumstances that inclosure of even a small portion of a common is sanctioned, and it is usually stipulated in such cases that an equivalent area of land should be added to the common. If proposals are made in a private Bill promoted by a Railway Company or similar body for the acquisition of a small portion of a common it is the duty of the Ministry to make a special report to Parliament on the subject, and it is the policy of the Ministry to oppose such proposals unless satisfactory arrangements are made for the addition of an equivalent area.

The existing policy is undoubtedly in the interests of the great majority of the population, and the

quality and condition of the soil of most of the remaining common land of the country is not such as would on economic grounds justify its diversion to individual occupation for the purpose of food production. Certain commons were cultivated for the production of food during the Great War, but very heavy expenditure on drainage, roadmaking and the provision of buildings would be necessary before most of the common land could be cultivated in normal times, and the cost of these operations would be prohibitive at present prices. In any case public opinion against the inclosure of open spaces is so strong that there would be great opposition to any proposals of the kind even where the commons are in districts remote from any large centre of population.

Regulation of commons as opposed to inclosure has not made much progress apart from the Metropolitan area. Less than 60,000 acres out of over 2,000,000 acres have been made subject to schemes of regulation or placed under the care of conservators or local authorities. This is probably due to the fact that regulation cannot be carried out without the consent of the Lord of the Manor in the case of a common which is waste of a manor, and may be vetoed by persons representing one third in value of the common rights. Subject to this, the Ministry may approve schemes of regulation submitted by District Councils and these schemes become operative without confirmation by Parliament.

Glebe Lands

A material part of the revenue of the rural clergy

is derived from the glebe lands attached to their benefices. In some cases this land was presented to the Church in early days and in others it was granted under Inclosure Acts in exchange for tithe. According to a Parliamentary Return of 1887 the total area of Glebe Land in England and Wales was just under 660,000 acres, with a gross estimated rental of over £900,000. Under the Glebe Lands Act, 1888, the Ministry is empowered to authorise the sale of the glebe (except the parsonage house and land necessary for its enjoyment) if it is satisfied that the sale would be for the permanent benefit of the benefice. Up to the middle of 1926, 129,864 acres had been sold for a total sum of £4,871,069 or an average of £37 10s. per acre. Before a sale can be sanctioned, notice has to be given to the bishop and patron and also to the parishioners, and the Ministry is bound to require that the land should be offered for sale in small parcels or to the local authority for allotments or to satisfy itself that such offer is not practicable without diminishing the price obtainable. The purchase money is paid to the Ministry who invest it in the name of the Ecclesiastical Commissioners on behalf of the benefice.

Universities and College Estates

The Ministry is the custodian of the corporate estates of the Universities and Colleges of Oxford and Cambridge, the University of Durham, Winchester College and Eton College. At common law these bodies had power to dispose of their lands as they thought fit, but by certain Statutes of Elizabeth they were disabled from making any

alienations or dispositions of their lands except leases for 21 years or three lives, or, as to houses in towns, 40 years.

Under a series of Acts of the last century the Universities and Colleges have been given the powers of a tenant for life and can dispose of their property subject to the consent of the Ministry in cases of sale, enfranchisement, exchange, partition, and certain cases of leasing. The Ministry is in the position of a trustee of a settled estate, and its duty is to see that the permanent inheritance of the colleges is safeguarded and preserved, and that future benefits are not anticipated by the present generation. The proceeds of sales of land by the Universities and Colleges are either invested in trustee securities in the name of the Ministry *ex parte* the University or College, or applied in the purchase of other land or the repayment of loans. Up to the middle of 1926 transactions exceeding £16,700,000 in the aggregate had been carried out with the approval of the Ministry, and the securities held by the Ministry were of the nominal value of over £5,700,000. In dealing with these investments the Ministry acts in consultation with the Bursars of the respective Colleges and is advised by the Bank of England and the Government Brokers.

Chapter XIV

AGRICULTURAL LABOUR

THE industry of agriculture is still one of the largest employers of labour in the country, and the problem of retaining a sufficient supply of labour on the land is becoming increasingly serious, in consequence of the competition of other occupations in which wages are higher. Owing to the scattered character of the industry and to the large number of individual employers, the organisation of labour in trade unions is particularly difficult in agriculture. It has therefore been considered desirable to make statutory provision for the regulation of the wages of agricultural labourers, and the Ministry of Agriculture is responsible for the administration of the Acts which have been passed for the purpose.

The first step was taken in the Corn Production Act, 1917, which prescribed that no able-bodied man should be employed in agriculture at a wage of less than 25s. a week, and set up an Agricultural Wages Board to fix minimum rates for the various classes of agricultural labourers. Under this Act the responsibility for the minimum rates rested with the central Wages Board, though District Committees were constituted of an advisory character. The Wages Board was also responsible for the enforcement of the minimum rates.

When the corn subsidy was withdrawn in 1921, the Agricultural Wages Board was abolished at the same time, and for the next three years agricultural wages were left without any statutory protection, though voluntary Conciliation Committees were set up in the hope of securing agreed rates by collective bargaining. These Committees however in the main proved a failure, and in 1924 a new Act was passed establishing the system which is now in force.

Under this Act the primary responsibility for fixing minimum rates of wages was placed on 47 District Committees, each covering one or more Counties. A central Wages Board was also established, but its power is confined to acting in default of any District Committee which fails to fix a minimum rate, and to making the Orders which are necessary to carry out the decisions of the District Committees. The duty of enforcing the Orders of the Board is placed on the Ministry.

The District Committees are composed of from six to eight representatives of employers and of workers, together with two impartial members appointed by the Minister, and a Chairman who is either elected by the Committee or, in default of agreement, is appointed by the Minister. The Wages Board consists of eight representatives of employers and eight representatives of workers, together with five members appointed by the Minister, one of whom acts as Chairman.

The representatives of employers on the District Wages Committees and on the Wages Board are appointed by the National Farmers' Union, and

the representatives of workers by the National Union of Agricultural Workers and the Workers' Union. The National Farmers' Union includes in its membership a large proportion of the farmers who employ labour, but a much smaller proportion of the workers are enrolled in either of the two Labourers' Unions. No special provision is made for the representation of those farmers or workers who are not members of any of the organisations, as it would be almost impossible to devise any satisfactory machinery for electing such representatives. Moreover there are obvious advantages in having representatives who can speak with the authority of an organised body behind them, and organisation on both sides tends to facilitate the acceptance of the decisions of the Committees. Provision is made by the Ministry for payment of the expenses incurred by the members of the Committees and of the Wages Board in attending meetings, including compensation for loss of wages in the case of the workers' representatives. The selection of the impartial members on the Committees and on the Wages Board is made by the Minister, and endeavour is made to obtain the services of men or women who have a knowledge of the industry and possess a judicial outlook, but who are not directly interested as agricultural employers or workers. The Ministry provides offices and Secretaries for the Committees and the Wages Board. In many cases the same Secretary acts for two Committees.

The primary duty of the District Wages Committees is to fix minimum rates of wages

for all workers employed in agriculture. The rates may be fixed so as to apply universally to all workers, or varying minimum rates may be fixed for special classes of workers. Special rates may also be fixed for harvest work. It is the usual practice to fix a minimum rate for able-bodied male workers of 21 years old and upwards, with lesser rates for each group below that age. Although the Committees have no power to fix the hours of work, the minimum rate has to be based on a specified number of hours per week, and those hours tend to become the standard hours for ordinary workers. Any time that may be worked over the specified hours has to be paid for at overtime rates. Most of the Committees have also fixed minimum rates for women workers, but these are usually fixed on the basis of hourly rates. Workers in charge of animals work longer hours than the ordinary agricultural labourers, and the Committees fix higher minimum rates for them as special classes.

If there is a difference of opinion on a District Wages Committee as to the minimum rate for any class of workers, the question has to be decided by a vote. In such cases the votes of the representative members on each side are equalised, and consequently the votes of the appointed members carry the day. The appointed members are therefore in effect arbitrators between the two sides. If no agreement as to minimum rates can be arrived at by a District Wages Committee, the responsibility of fixing the rates falls on the Agricultural Wages Board, but up to the present no case has arisen in

which action by the Wages Board has been necessary, and the function of the Board has been confined to making the necessary Orders to give legal effect to the decisions of the District Wages Committees.

When an Order has been made and duly advertised the minimum rates so fixed are compulsory on all employers in the district, and it becomes a penal offence to employ any worker at lower rates. In addition, any worker so employed can take civil proceedings for the recovery of the difference between the actual wages paid and the minimum rates. The Ministry is responsible for the proper observance of the Orders and for enforcing the Act, and for this purpose it employs a staff of Inspectors, who are authorised to visit farms, inspect the farmers' time and wages sheets and obtain any information necessary to ascertain whether the provisions of the Orders are being complied with. In cases where it is found that wages below the minimum rates are being paid, the employers are either given the opportunity of paying the arrears of wages due, or if it appears that the evasion of the Act is deliberate and not due to ignorance or misunderstanding, the Ministry prosecutes the employer, who on conviction may be fined, in addition to having to pay the arrears due.

A considerable number of complaints of under-payment are received by the Ministry, and these are investigated by the Inspectors, unless correspondence proves them to be groundless. This work involves a considerable amount of travelling and local enquiry on the part of the Inspectors and

calls for the exercise of much tact and judgment to arrive at the correct facts. In many cases there is a complete absence of any written records of hours and wages, and conflicting verbal evidence from the employer and his workers may render the task of the Inspector a difficult one.

In addition to fixing minimum rates of wages, the District Wages Committees are responsible for making Orders fixing overtime rates and defining the employment which is to be treated as overtime, and also Orders defining the benefits or advantages which may be reckoned as part payment of minimum rates of wages in lieu of payment in cash. The usual practice is to define overtime employment as all time worked in excess of the weekly hours on which the minimum rate is based. The overtime rate is always in excess of the normal minimum hourly rate, but the amount of the excess varies considerably in different districts. On the average, overtime on weekdays is paid at the rate of time and a quarter and on Sundays at the rate of time and a half.

The Act requires that Committees should so far as is practicable, secure a weekly half holiday for agricultural workers. This has been secured in most districts by including in the Orders a provision that all employment in excess of a specified number of hours on one day in each week shall be paid at overtime rates. The result is that the workers are given a half holiday unless the farmer is prepared to pay them at overtime rates. In regard to female workers, however, a considerable number of the District Committees have not taken steps to

secure to them the benefit of a weekly half holiday.

It has long been the custom in many parts of the country to provide part of the remuneration of agricultural workers by allowances in kind. In some cases cottages are provided rent free, and in certain Counties milk or potatoes are provided, coal is carted or a piece of ground for growing potatoes is allotted. In other areas many of the labourers are lodged and boarded by the farmers. In view of the establishment of a statutory minimum wage it became necessary to assess the value of these allowances so as to ensure that the total earnings of the workers were not less than the minimum wage for the district. Accordingly the District Wages Committees have had to make orders defining what benefits or allowances may be reckoned as part payment of minimum rates of wages and fixing the value of the benefits or advantages.

It is often said that the Act has resulted in fixing the rents of agricultural labourers at 3s. a week and that as this is an uneconomic rent it has discouraged the building of new cottages. That is not really the case. Neither the Act nor the Orders of the Wages Committee can limit in any way the rent chargeable for an agricultural labourer's cottage. All that is done is to forbid the deduction from the cash wage of a labourer of more than a specified sum in respect of a cottage which is provided as part of the remuneration of a labourer. The majority of Committees have defined the weekly value of a cottage as 3s., but in a few areas it is a shilling more or less. Many Committees also provide that, while

3s. a week is the standard value, the actual amount deducted may be reduced in cases where they are satisfied that the cottage is defective.

Board and lodging has been specified as a benefit in many districts, and the permitted deductions from wages vary from 14s. to 17s. a week for adult male workers. The deduction for board and lodging for women workers is in some cases the same as for men, but in certain areas it is on a lower scale, varying from 12s. to 13s. a week. Allowances of milk or potatoes are usually valued at current wholesale prices.

A considerable number of agricultural workers are men who from physical injury, mental deficiency or old age are unable to do a full day's work, and the Act provides that in such cases the employer or the worker may apply to the District Wages Committee for a permit of exemption authorising employment at a rate of wage lower than the minimum rate. The consideration of applications for permits of exemption is usually referred to a sub-committee consisting of one or two representatives of employers and workers respectively and an impartial Chairman. Both the employer and the worker are usually interviewed, and in any case the worker is given an opportunity of objecting to an application for a permit by his employer. During the first two years after the Act came into operation over 13,500 applications for permits of exemption were dealt with, of which 11,000 were granted. It is open to Committees to attach conditions to the permits specifying the actual wage to be paid, but in the case of men over 65, it is usual to grant permits

without specifying any particular wage. In cases where the wage is specified the deduction from the minimum wage may vary from 1s. to 5s. a week, or in some cases even more. Permits are usually granted for indefinite periods, but in some cases they are reviewed on the occasion of any alteration of the minimum rates.

The general effect of the Act has been to raise the standard of wages, particularly in the low paid areas. In nearly every area there has been an increase, which in some cases has been as much as 5s. 6d. a week. In addition to raising the general level, it has forced individual employers who were paying particularly low wages up to the rates paid by the better farmers in the district. The general average for the whole country in the case of ordinary labourers in 1927 was about 31s. 6d. per week, as compared with 28s. a week before the passing of the Act in 1924, and 18s. prior to the War. This increase is roughly equivalent to the rise in the cost of living, so that from that point of view the workers are not materially better off than before the War. On the other hand the hours of work have been reduced considerably, and the workers have the benefit of a guaranteed week and, in most cases, a weekly half holiday. Further, the machinery of the Act ensures to the worker that if agriculture becomes more prosperous he will share in the increased prosperity by the raising of the minimum wage.

While it cannot be said that the general body of farmers welcomed the passing of the Act, there is general agreement that they could not hope to retain an efficient and adequate supply of labour at

lower rates. On the whole the Act has worked smoothly and well, and the number of cases in which there has been any deliberate evasion of the provisions of the Act has been small. Less than one hundred employers had to be prosecuted by the Ministry for non payment of the minimum rates of wages during the first two years after the Act came into operation.

Chapter XV

LAND DRAINAGE AND IMPROVEMENT

FOR nearly a hundred years the Ministry and its predecessors have had to administer a number of Acts of Parliament passed with the object of assisting in the provision of the buildings and other permanent equipment necessary for the cultivation of the land, and also with the object of securing the efficient drainage of land, which is one of the most important factors in its capacity for production.

Under the traditional system of landlord and tenant, which in spite of the break up of many of the large estates, still obtains over the greater part of agricultural England, the landlord is regarded as responsible for the provision of permanent equipment, including field drainage. But most land is held under settlements, and the landlord is a tenant for life who is not free to deal as he likes with the capital value of his estate. It was necessary therefore to provide means by which he could raise the money necessary for permanent improvements, without which it might not be possible to let his farms to the best advantage. In some cases the trustees of the settled estate had funds at their disposal which could be used for the purpose. In such cases the Settled Land Acts provide that the Ministry should either itself certify that the improve-

ments have been properly carried out, and the amount which is properly payable by the trustees, or it may approve the appointment of a competent surveyor, nominated by the trustees, to give the certificate. This measure of control is designed to safeguard the interests of the successors of the tenant for life, so that the permanent value of the estate is not dissipated or impaired. In practice the certification of the improvements is almost always carried out by a surveyor nominated by the trustees, and the duty of the Ministry is confined to the approval of the name submitted.

In many cases however landowners, whether they are absolute owners or tenants for life, find it necessary to raise money from outside sources to finance permanent improvements. To meet these cases a series of Improvement of Land Acts and Drainage Acts have been passed to enable owners to raise money for improvements, secured by a first charge on their estates. In the first instance the Acts were confined to drainage, and the first Act, which was passed in 1846, authorised the issue of loans from public funds up to a maximum of £2,000,000 for Great Britain to enable landowners to carry out works of drainage. The loans were secured by a rentcharge payable to the Crown at the rate of 6½ per cent., including amortisation, which would repay the loan in 22 years, and the rentcharge had priority over all other charges on the land except mortgages. Any works proposed for a loan had to be approved by the Inclosure Commissioners, who were required to satisfy themselves that the works would effect an improvement

in the annual value of the land in excess of the annual charge, before any loan was granted.

The whole of the £2,000,000 authorised by the Act of 1846 was applied for and appropriated within three years, and the loans have long since been repaid. The transaction is therefore of historic interest only, but the procedure of the Act was followed in a series of other Acts which are still in operation, except that the funds have since been raised from private sources, and not from the Exchequer.

From 1849 to 1864 Acts were passed enabling owners, with the sanction of the Inclosure Commissioners, to raise money for drainage and other capital improvements on the security of a first charge on their estates, and a number of private statutory Companies were incorporated to provide the necessary funds. These Acts, with some subsequent amendments, are now administered by the Ministry of Agriculture, and one statutory Company, the Lands Improvement Company, has absorbed the powers of all the other Companies.

Under these Acts any landowner who desires to carry out certain specified improvements on his estate may apply to the Ministry for sanction to the creation of a charge on his property. The improvements include drainage, reclamation, planting, the erection of cottages and farm buildings, and other agricultural purposes, and the procedure of the Acts has been applied by other Acts to the erection and improvement of mansion houses, to sewage works and to works of water supply.

On receipt of an application, the Ministry

arranges for an inspection of the land, which is usually undertaken by one of the District Commissioners of the Land Division. The Commissioner makes a report as to whether in his opinion the proposed improvement will effect a permanent increase of the annual value of the land exceeding the amount of the annual charge that will be involved. If so, a Provisional Order is made by the Ministry prescribing the maximum amount to be spent, including costs, the rate of interest, and the term of years within which repayment must be made, which varies in accordance with the probable life of the improvement up to a maximum of 40 years. After the issue of the Provisional Order, the land-owner submits for the approval of the Ministry detailed specifications and plans, and, when these are approved, the work may proceed. After the completion of the works, the Ministry issues an Absolute Order, which creates a legal charge on the land in priority over every other existing or future charge, except tithe rentcharge. The charge may be created under the general Improvement of Land Acts or under the private Acts of the Lands Improvement Company. In the latter case the Company provides the capital cost of the improvement, and raises the necessary funds for the purpose by assigning the charges to Insurance Companies and other similar bodies, to whom the charges are a suitable and well secured form of investment. The priority of the charges secures that they are well covered, and the justification for placing them in front of existing mortgages, even without notice to the mortgagees, is that they are not sanctioned

unless the Ministry is satisfied that there will be at least a corresponding increase in the annual value of the estate. The interests of mortgagees and of successors in ownership are therefore not prejudiced. Under the provisions of the Improvement of Land Acts over £19,000,000 has been authorised in the last 80 years, mainly for drainage of cottages and farm-buildings, and in addition the Ministry has approved surveyors or has itself issued certificates for the expenditure of a further sum of over £5,000,000 under the Settled Land Acts.

Arterial Drainage

The drainage works carried out under the Acts mentioned above are almost entirely field drains, but, if land is to be cleared of superfluous water and prevented from becoming waterlogged and unproductive, it is necessary to see that the drainage of the fields should get into the rivers, and the rivers must take it to the sea. This is the problem of arterial drainage. It is a problem which cannot be solved by any one landowner and must be the subject of corporate action. A single landowner, who allows a river under his control to become obstructed so as to impede the flow of water, can nullify the efforts of all his neighbours, and the silting up of an outfall or estuary may hold up the water in a river to such an extent that large areas of land may be flooded or seriously waterlogged.

Accordingly from the earliest times the State has had to intervene and take action to secure efficient measures of arterial drainage, and also for the

protection of the coast from encroachment by the sea and the construction and maintenance of adequate sea defences. Prior to any legislative action, Commissions were frequently issued by the King to enquire into the state of sea defences, to require their repair and maintenance and to assess the expense on those who benefited from the works. The Romney Marsh Commission, which is still in existence, was established by King Henry III in 1225. The first important statute on the subject was in the reign of King Henry VI in 1427, which declared that for a period of ten years His Majesty had ordained that Commissions of Sewers should be sent into all parts of the realm where needful. In the reign of King Henry VIII the famous Bill of Sewers of 1531 was passed, which laid the foundation of the practice which has been followed for nearly 400 years. The Bill established "a settled course of Commissions of Sewers" with a "verie endlesse power such as hath neither length nor breadth against offenders"; and it empowered the appointment of Commissioners to survey, maintain and repair existing walls, banks, sewers and water-courses, to remove impediments and obstructions, and to levy rates for their expenses. Later Acts also authorised Commissions of Sewers to execute new works, and with this addition the Bill of Sewers of Henry VIII was the foundation of all subsequent drainage legislation. This is particularly the case in regard to the principle on which drainage rates are levied, viz. that only those owners whose land is liable to flooding and who therefore benefit by the works can be chargeable. This has been

interpreted to mean that owners of land which is above the flood line pay nothing towards the upkeep of the main arteries which convey the water from their land to the sea. In recent years this principle has been challenged. The increased cost of the construction and maintenance of drainage works often throws a prohibitive burden on a limited area. Moreover the development of the country, the improvement of roads, etc., has resulted in the water from the upland areas getting away more rapidly than was formerly the case, and has increased the burden upon rivers which were already none too adequate. It is probably true to say that, while England is well provided with rivers, there is no river, except possibly the Thames, that is in a reasonably efficient state as an outlet for the drainage of the land in its watershed. In many cases, such as the Great Ouse, it is estimated that the cost of improving the channel and outfall so as to discharge the water effectively, and remove the risk of flooding, would amount to millions of pounds. There is therefore increasing support for the view that in the altered circumstances of the present day the area of charge should be increased to include all the land in the watershed.

Under the Act of Henry VIII a considerable number of Commissions of Sewers have been established. They are not elected by the persons over whom they exercise jurisdiction, but are appointed by the Crown. Members must have a landed qualification, and they are appointed for life on the recommendation of the Home Secretary, who consults the Ministry with regard to new appointments.

Under the Land Drainage Act of 1861 a new method was adopted for the establishment of Drainage Authorities. While leaving untouched the existing Commissions of Sewers, and providing for the appointment of new Commissions on a petition presented to the Ministry by the proprietors of one-tenth of an area, the Act also provided for the constitution of elective Drainage Boards. The procedure was also by petition from the proprietors of one-tenth of the area, and the Ministry could establish a Board by a Provisional Order subject to confirmation by Parliament, if it was satisfied that the proprietors of two-thirds of the area were in favour of it. By the Land Drainage Act of 1918 these provisions were amended so that a petition could also be presented by the County Council, and the Ministry itself could proceed on its own initiative without any petition. Instead of having to obtain the consent of the proprietors of two-thirds of the area, new Drainage Boards can be constituted unless the proprietors of one-third of the area dissent, and the Orders constituting the Boards do not require to be submitted to Parliament unless they are opposed. The Order names the members of the first Board, and provides that after a year the Board shall be elected by the persons who have paid drainage rates in the area. The electors have a number of votes proportionate to the value of their rateable property. Votes may be given either personally or by proxy and the members of the Board are elected for one year, but are eligible for re-election.

In addition to Commissions of Sewers and Elective Drainage Boards, there are a large number of Drainage Authorities which have been constituted by special Acts of Parliament, examples of which are the Thames Valley Drainage Commissioners and the Black Sluice Commissioners, and in recent years several County Councils have obtained special Acts of Parliament constituting them as Drainage Authorities. There are also a large number of small areas which have been the subject of Inclosure Awards containing provisions with regard to the construction and maintenance of drainage works. In many cases they have fallen into abeyance in the absence of any effective authority to administer them. Finally by an Act passed in 1926 County Councils and the Councils of County Boroughs were given power to carry out small drainage schemes in areas not covered by a Drainage Authority, and to recover the cost from the owners concerned.

There are therefore a large number of Authorities with differing constitution and powers. There are some 50 Commissions of Sewers, some of them covering large but ill-defined areas; at least 100 Authorities created under special Acts; and over 100 elective Drainage Boards, in addition to the County Councils and County Borough Councils. The interests of these Authorities often conflict and their jurisdiction overlaps. Up till a few years ago the tidal portion of the Great Ouse, a length of some 35 miles, was controlled as to its channel by five River Authorities, and as to its bank by nine Banks Authorities, all of whom acted quite inde-

pendently of one another, and there was no co-ordination of interests for the general improvement of the river. In addition there were over thirty separate Commissions of Sewers or Drainage Boards having jurisdiction over areas which drained into the Ouse. Since then an amalgamation has taken place, at the instance of the Ministry, of the Authorities controlling the channel, outfall and banks of the river, but no final solution has yet been arrived at for the execution of the large and expensive works which are necessary for the effective drainage of the area.

The great area of the Fens in the east of England, which has been described as the most fertile plain in Europe, owes its existence to an elaborate drainage scheme carried out by public spirited landowners, such as Francis Earl of Bedford, assisted by Dutch engineers, in the seventeenth century. Prior to that time the whole area was a great swamp which is vividly described in Kingsley's "Hereward the Wake"; the Isle of Ely was really an island; and, in the words of Lord Ernle, "Here dwelt an amphibious population, travelling in punts, walking on stilts, and living mainly by fishing, cutting willows, keeping geese and wild-fowling." The drainage of this area was a great piece of reclamation, and the result was, in the words of Sir Cornelius Vermuyden, the Dutch engineer, that "wheat and other grains, besides innumerable quantities of sheep, cattle and other stock were raised, where never had been any before." The removal of the water greatly lowered the level of the land, and much of it is now below

sea level. Consequently the surplus water has to be lifted by pumping into the arterial channels which discharge it into the sea, and Drainage Authorities have to provide and maintain powerful centrifugal pumps capable of raising as much as a hundred tons of water a minute against a lift of several feet. The cost of maintaining the drainage system in such an area involves drainage rates which in some cases are in excess of the rental value of the land.

For a good many years past the maintenance of efficient drainage has been greatly neglected in many parts of the country, and some of the Drainage Authorities have practically ceased to function. It has been estimated that no less than 2,000,000 acres of agricultural land are seriously waterlogged owing to the lack of efficient arterial channels and outfalls, and the consequent loss of production is very considerable. Since the War the Ministry has been able to assist in carrying out improvements in many areas by making grants in aid of drainage schemes, which have been undertaken for the relief of unemployment. A sum of over £1,250,000 has been expended on these schemes, of which the Ministry has provided £850,000 ; but much remains to be done, especially in the execution of large engineering works to improve the outfalls and channels of some of the principal rivers. For this purpose, a sum of £1,000,000 has been placed at the disposal of the Ministry to enable grants to be made varying from 33 to 50 per cent. of the cost of approved schemes carried out by statutory Drainage Authorities.

Chapter XVI

COMMERCIAL CONTROL. RATS AND MICE

THE Ministry has to administer a number of Acts of Parliament designed to protect farmers from fraud or to ensure the quality of the requirements they have to purchase. Other functions are concerned with the protection of consumers in regard to the nature and quality of agricultural produce. In the first category are the Acts relating to Seeds and to Fertilisers and Feeding Stuffs, and in the second category the Merchandise Marks Acts, the Sale of Food and Drugs Acts and the Regulations as to the production and sale of Milk.

Seeds Act

During the Great War one of the measures which were taken to increase the production of food was the Testing of Seeds Order, which was made by the Ministry under the emergency powers then available. The object of the Order was to protect the farmer against the losses consequent on purchasing and sowing seeds of low vitality and contaminated with weed seeds. No control was exercised over the freedom of the farmer to buy whatever seeds he desired, but the Order required the seller to disclose certain essential facts so that the purchaser could judge the value of the seed with a fair degree of accuracy. The facts which

had to be disclosed were the percentages of germination and purity and the presence of injurious weed seeds.

After the War, the temporary provisions of the Testing of Seeds Orders were made permanent by the Seeds Act, 1920. The Act empowered the Ministry to make regulations specifying the kind of seeds to which the Act should apply and prescribing the manner in which samples could be taken and dealt with. Regulations have been made accordingly after consultation with the seed trade, and, as regards forest tree seeds, with the Forestry Commission, and all the principal grass and clover seeds, cereal seeds, field and garden seeds and seed potatoes can only be sold subject to the requirements of the Act and Regulations.

The effect is that the commercial sale of agricultural seeds must be accompanied by a declaration that (except in the case of seed potatoes) the seeds have been tested, and stating the kind of seed and in certain cases the distinctive variety, the percentages of purity, germination and injurious weed seeds within certain specified limits of variation. The Regulations also prescribe certain minimum percentages of germination for each class of seed. In the case of seed potatoes particulars have to be supplied stating whether the seed was grown in Scotland or Ireland, or whether it was grown in England or Wales from seed grown in Scotland or Ireland in the preceding year, i.e. what is known as "English once grown." The variety must also be stated and the size and dressing of the potatoes.

The Ministry is responsible for the administration and enforcement of the Act and the work is undertaken by the general Inspectorate of the Education Division, who are authorised to enter any premises where seeds are sold and to take samples. Each sample must be divided into two parts, one of which must be delivered to the owner of the seeds, and the other sent to the Official Seed Testing Station. If it appears after testing of the sample that the particulars required to be given are false, proceedings may be taken by the Ministry against the seller in a court of summary jurisdiction. Offences under the Act are punishable by a fine not exceeding £5 for a first offence, and a fine not exceeding £10 for a second or subsequent offence, and such penalties are without prejudice to any civil action for damages which may be taken by a purchaser.

After the Act came into operation many thousands of visits were paid by the Ministry's Inspectors to seed merchants all over the country in order to advise them of the requirements of the Act and to take control samples. The Act is now well understood, and the intensive campaign which was conducted when it first came into operation is no longer necessary. But in the course of their other duties the Inspectors watch the observance of the Act, and each year over 1,000 control samples are taken. It is only in a small minority of cases that it is found necessary to institute prosecutions.

Seed Testing Stations

In order to provide for the testing of seeds, the

Ministry established during the War an Official Seed Testing Station in London. When the National Institute of Agricultural Botany was established at Cambridge in 1921, the Official Seed Testing Station was moved to the same building and was placed under the control of the Council of the Institute, though the cost of its upkeep is borne by the Ministry. The Station is available for the testing of seeds either for seed merchants or for farmers, and over 20,000 samples are received and tested each year. Fees are charged which go some way towards defraying the cost of upkeep, but the Station involves a net charge on public funds of some £4,000 a year. In addition to the Official Seed Testing Station the Ministry is bound to licence private Seed Testing Stations, provided that they are efficiently conducted. Most of the large firms of seed merchants have their own Testing Stations, and over 80 of them have been licensed by the Ministry for the purposes of the Seeds Act.

In addition to the work carried on under the Act, the Official Seed Testing Station carries out investigations into seed problems, provides courses of training and conducts examinations for Seed Analysts, convenes Conferences and issues from time to time a Seed Analysts' Bulletin.

Fertilisers and Feeding Stuffs Acts

Although farmers are much more educated than they were formerly in the chemical properties of artificial fertilisers and in the value of the constituents of the principal feeding stuffs, they require

protection against fraud and some security that the articles they purchase are genuine and worth their price. With these objects a series of Acts have been passed, the latest of which is the Fertilisers and Feeding Stuffs Act of 1926. The average farmer obviously cannot carry out chemical analyses himself, and the Act provides therefore for the appointment by each County Council, subject to the approval of the Ministry, of an agricultural analyst and of inspectors and official samplers. Every sale of a fertiliser or feeding stuff has to be accompanied by a statutory statement setting out certain prescribed particulars of the nature, substance or quality of the article. In the case of feeding stuffs the presence of certain specified deleterious ingredients must also be disclosed. These statements constitute a warranty, and it is the duty of the official samplers to take samples of fertilisers or feeding stuffs at the request of purchasers in order to test the correctness of the warranty. Any sample taken is divided into three parts, two of which are sent to the County agricultural analyst and the other to the owner or seller. The certificate of the county analyst is sent to the parties, who can, if they so desire, appeal to the Government Chemist, who acts for this purpose as the Chief Agricultural Analyst of the Ministry. If on analysis it is shown that the particulars in the statutory statement are incorrect, it may form the basis of civil proceedings for damages.

In addition to the civil liabilities under the Act, criminal prosecutions may be instituted for failure to give the statutory statement or for giving a

false statement. In the latter case, the consent of the Ministry must be obtained before a prosecution is instituted. The administration of the Act is entrusted to the County Councils and the Councils of County Boroughs, whose inspectors are given a power of entry to merchants' or manufacturers' premises for the purpose of taking samples or inspecting the registers, etc. required to be kept under the Act. The Ministry has concurrent powers of inspection and prosecution and can act in default of a Council and recover the cost. The Act provides for the establishment by the Ministry, in conjunction with the Board of Agriculture for Scotland, of an advisory committee to assist in drawing up regulations under the Act, and in preparing for submission to Parliament any amendments which experience may show to be desirable in the schedules to the Act.

Merchandise Marks Acts

The Board of Trade is responsible in general for the administration of these Acts, except as regards agricultural and horticultural produce and the produce of any fishing industry, which fall to be dealt with by the Ministry of Agriculture and Fisheries.

The Acts are designed to prevent the application to imported goods of any false or misleading description which might cause purchasers to think that they were home produce; and, under certain conditions, the Acts also provide machinery for requiring the marking of imported produce with an indication of origin, which may be either the

word "foreign" or the word "Empire," or the name of the country of origin. The Acts also apply to home produce so as to forbid the use of a false or misleading trade description, such as the description as cider of a beverage not made from apples.

In their application to imported produce the Acts would forbid the description of imported eggs or meat as English, and prosecutions have from time to time been successfully instituted by the Ministry for such offences. It is however difficult to obtain evidence sufficient to justify a conviction, as in many cases there is no such written misdescription as is forbidden by the Acts. It is suggested therefore that in order to protect consumers from being supplied with imported produce when they desire and are willing to pay for home produce, it should be made compulsory that imported produce should be marked, either on importation or on sale with an indication of origin. For this purpose a standing Committee of three disinterested persons has been appointed by the Ministry under the Acts to consider and report on any application for the marking of any imported goods which is submitted by a representative body of producers or consumers. The Committee reports whether the produce in question should be marked, and, if so, how, and their report is published and presented to Parliament. If marking is recommended an Order in Council may be made requiring the marking and prescribing the manner in which it shall be carried out.

Prior to the Act of 1926, the enforcement of the

Merchandise Marks Act was left to the central Departments, viz. the Board of Trade or the Ministry of Agriculture and Fisheries, but the Act of 1926 empowered Local Authorities to inspect premises, take samples and institute proceedings, and it is expected that this will enable the Acts to be more efficiently and completely enforced, and will relieve the Government Departments concerned of a responsibility which they could not carry out except with a large increase of staff.

Food and Drugs Acts

The central Department which is mainly responsible for these Acts is the Ministry of Health, but the Ministry of Agriculture has certain concurrent powers in relation to articles affecting the interests of agriculture. It has also certain special duties under the Acts of 1899 and 1907. Under the former Act the Ministry can make regulations setting up a presumptive standard for milk, cream, butter and cheese. Under the Sale of Milk Regulations it is provided that milk containing less than 3 per cent. of butter fat or 8.5 per cent. of milk solids other than milk fat is presumed not to be genuine, unless the contrary is proved. The object of the Food and Drugs Acts is to protect the public from adulteration, and the presumptive standard for milk was intended to place on the producer the onus of explaining any inferiority of his milk as compared with the standard.

The Acts are administered by the Local Authorities, and in view of the greater responsibility of the Ministry of Health as the central public

health authority, the Ministry of Agriculture does not maintain any special staff or take any active part in their general administration.

In regard to butter and margarine, however, the Ministry has certain definite duties. No fancy names can be used for margarine or for milk blended butter unless the approval of the Ministry is obtained to the name proposed, and no name may be approved which is suggestive of butter or of anything connected with the dairy industry. Margarine and butter factories have to keep registers of the quantities and destinations of consignments of margarine or butter sent out, they are liable to be entered and inspected by officers of the Ministry, and restrictions are imposed on the quantity of water in margarine or butter, and on the amount of butter fat in margarine.

Milk and Dairies Order

Under the Milk and Dairies Acts, the Ministry of Health may make Orders as to the registration of dairymen, the health and inspection of cows, the cleanliness of dairies and other matters designed to secure milk against infection and contamination. Such Orders, however, can only be made with the concurrence of the Minister of Agriculture, in order that there may be security that requirements are not imposed on the dairy industry in the interests of public health which would defeat their purpose by seriously restricting the production of milk. The two Departments have agreed on an Order issued in 1926, some parts of which do not come into operation till 1928, which will, it is hoped, raise the standard of milk production and provide

adequate safeguards to the public that the milk they consume is clean and wholesome.

Rats and Mice

A function of the Ministry which does not fall within any of the general categories of its work is that connected with the destruction of rats and mice. It is estimated that there are no less than 40,000,000 rats in the country, and that the loss due to them amounts to £15,000,000 a year. They increase at an alarming rate, and one pair of rats can produce in fourteen months as many as 3,000 descendants. A hundred rats will eat or spoil the equivalent of twelve quartern loaves of bread a day. Statutes were passed as long ago as the time of Henry VIII and Elizabeth enjoining the destruction of rats and mice, but in modern times no organised or concerted attempt at their suppression was made until the Great War, when all possible economy in food became essential. An Order under the Defence of the Realm Act was made empowering Local Authorities to take steps to secure the destruction of rats, and in 1919 an Act was passed through Parliament with practically no opposition.

The Act makes it a penal offence for any occupier to fail to take reasonably practicable steps to free his premises from rats and mice, it empowers Local Authorities to serve notices on occupiers, and if necessary to enter their premises, destroy the rats and mice, and recover the cost, and it empowers the Ministry to act in default of a Local Authority which neglects its duty.

At one time the Ministry had a small staff of

Inspectors to see that the Act was administered, and to advise Local Authorities, Railway Companies and the owners of large establishments. The Ministry also had a small factory in London at which rat baits and poisons were made for use in Government establishments. But, by a doubtful piece of economy, the Inspectors were dismissed and the factory closed as a result of one of the recommendations of the Geddes Committee, and the Ministry was left with only one rat expert on its staff. This officer has done excellent work in advising as to the best and most economical methods of rat destruction and among other feats he succeeded in clearing Lambeth Palace of rats. Each year a National Rat Week is organised during which Local Authorities and others are urged to arrange concerted attacks on the rats, and in several areas over 200,000 rats have been killed during the week. It must be admitted however that the administration of the Act is far from being effective or uniform, and that while it has done something to prevent an increase which might otherwise completely eat us out of house and home, it has not effected any marked decrease or done much to save the appalling loss of food which still goes on.

Chapter XVII

THE FISHERIES DEPARTMENT

By HENRY G. MAURICE, C.B.,
Fisheries Secretary to the Ministry.

THE position of the Fisheries Department is somewhat peculiar. It is the vehicle of the activities in respect of Fisheries of the Minister of Agriculture and Fisheries, but these activities are, through circumstances which will appear hereafter, curiously limited. The jurisdiction of the Minister is confined to the fisheries of England and Wales and he does not exercise any statutory executive powers in respect of deep sea fishing, which is the source of certainly not less than 90 per cent. of the total British landings of fish. Deep sea fishing is regulated by Acts ratifying and embodying International Conventions, of which the most important are the Conventions of 1839 and 1867 between Great Britain and France, the former of which is now largely obsolete, the North Sea Fisheries Convention of 1882, the Anglo-Belgian Declaration respecting the North Sea Fisheries, 1891, the International Conventions respecting the Liquor Traffic in the North Sea embodied in the North Sea Fisheries Act, 1893, the Anglo-Danish Convention of 1901 concerning fishing in the neighbourhood of Iceland and Faroe, and the Submarine Telegraphs Con-

vention of 1884. The administration of these Conventions and of the Acts embodying them, except in so far as they relate to shellfish fisheries, and of all regulations governing the registration, survey and, generally, the safety of sea-fishing vessels, is committed to the Board of Trade, and the enforcement of the Conventions at sea to the Admiralty. So far as sea fisheries are concerned, it is only in respect of fishing in territorial waters that the Minister exercises statutory administrative functions by virtue of the Board of Agriculture and Fisheries Act, 1903, and the Sea Fisheries Regulation Acts, 1888-1894 and those parts of the Sea Fisheries Acts which apply only to shellfish. He is also responsible for the administration of certain minor statutes such as the Cran Measures Act, 1908, the Herring Fishery (Branding) Act, 1913, relating to the branding of cured herrings in England and Wales, and the Fishery Harbours Act, 1915.

Historical

The present administrative position has been reached more or less at haphazard. Fisheries and fishermen have always played an important part in the history of these islands. In the Middle Ages Treaties between the Kings of England and their Continental neighbours appear to have included almost as a matter of course clauses relating to rights of fishing; the decline of the demand for fish which followed the Reformation was a matter of great concern to the Tudor Sovereigns; and the right of fishing in the North Sea was one of the principal topics of contention between the Stuart

Sovereigns and the Dutch. That fisheries always engaged a considerable amount of the time and attention of Parliament is sufficiently indicated by the fact that the Sea Fisheries Act of 1868 repealed in whole or in part no less than 64 statutes of various dates, from the reign of Henry VII to that of Victoria, relating to fisheries; and yet it is not till 1886 that we hear of a Department or Section of a Department devoted specifically to Fisheries in England and Wales. This was the Fisheries Department of the Board of Trade, set up in that year, and consisting of an Assistant Secretary, a Chief Inspector and two Inspectors, who were dependent for clerical assistance upon the staff of clerks attached to the Marine Department of the Board. In Scotland on the other hand, where the relative commercial and political importance of fisheries has always been greater than in England, we find the commencement of a fisheries administration at least as early as 1808, when there was constituted a body known as the Commissioners for the British White Herring Fishery. The Commissioners had their seat in Scotland, but their functions extended to the coasts of England. They administered bounties given for the encouragement of herring fishing, and had certain regulative powers. Scotland was, and is to this day, the centre of herring fishing, and it was not extraordinary that the herring fisheries should be administered by a Scottish body of Commissioners. In 1820, however, the Commissioners were instructed to take the Cod and Ling Fisheries under their charge, and thus it came about that the

English Fisheries as a whole, or at least the predominant branches of them which catered for a salt fish trade, were for a time administered from North of the Border. In 1850 the Commissioners abandoned their English stations, and it may be assumed that for practical purposes their connection with the Fisheries south of the border came to an end, but to this day the Fishery Board for Scotland, the direct successors of the White Herring Commissioners, are responsible within the county of Northumberland for passing cured herrings for the Crown Brand.

Meanwhile, the responsibility for fisheries in England and Wales was divided between the Home Office and the Board of Trade. Sea Fisheries presumably drifted to the Board of Trade as the Department concerned with the Mercantile Marine, with harbours and the foreshore; salmon and freshwater fisheries fell naturally to the Secretary of State for Home Affairs, who, through his Inspectors, also exercised jurisdiction over shellfish fisheries. It is interesting to recall that the late Professor Huxley and Frank Buckland served as Inspectors under the Home Office for this purpose. The jurisdiction of the Secretary of State in respect of shellfish was transferred to the Board of Trade by the Sea Fisheries Act, 1875, and in respect of salmon by the Salmon and Freshwater Fisheries Act, 1886. In the same year the Fisheries Department of the Board of Trade was established and was charged with the administration of the Sea Fisheries Acts and the Salmon and Freshwater Fisheries Acts, and, later, of the North

Sea Liquor Traffic Convention. Thus from 1890 to 1903 the central jurisdiction over Fisheries in England and Wales and a good deal relating to fishing in the United Kingdom as a whole was concentrated in the Board of Trade.

By the creation of the Fisheries Department of the Board of Trade and the priority given to Fisheries in the title of the Fisheries and Harbour Department, subsequently created, recognition was given to a promise made by Mr. Mundella, President of the Board, in response to the agitation for the more favoured recognition of fisheries which centred round the Great Fisheries Exhibition held in London in 1883. But the aspirations of the champions of the Fisheries were not satisfied. In the first years of the present century there was a pressing demand for scientific research affecting fisheries, and, in connection with it, for the constitution of an independent Ministry of Fisheries or for the association of fisheries with a Minister who could bestow more time and attention upon them than could the President of the Board of Trade.

Research was in the air; at conferences held in 1899 and 1901 at Stockholm and Christiania, respectively, the organisation of international investigations of fisheries was being discussed. In 1902 the International Council for the Exploration of the Sea, of which Great Britain was an original member, was established at Copenhagen, and in the same year a Committee on Ichthyological Research appointed by the Board of Trade recommended that the functions of the Fisheries and Harbour

Department of the Board should be enlarged so as to embrace Marine Research. It was decided, however, at the instigation, it is said, of the then President of the Board of Trade, to transfer the responsibility for fisheries, or as we have seen, a part of it, to the Board of Agriculture, who already had authority to conduct experiments and research and to collect information for the promotion of the industry of Agriculture. It was a comparatively simple matter to extend those powers to embrace Fisheries. The conjunction of Fisheries with Agriculture was justified on the ground that the two industries were producers of food, and this argument and the juxtaposition of the two industries in one department were parodied by the nickname given to the department of the "Board of Loaves and Fishes." By the Board of Agriculture and Fisheries Act, 1903, the Board of Agriculture became also the Board of Fisheries.

The Assistant Secretary of the Fisheries Division was appointed one of the British Delegates to the International Council for the Exploration of the Sea, but Great Britain's share of the investigations conducted in co-operation with the Council was entrusted until 1910 to the Marine Biological Association of the United Kingdom, an independent unofficial organisation, the contribution of the Board to the investigations being limited to the collection of statistics. In 1910 the Board took over the responsibility for the research work as well, and a considerable part of the personnel of the M.B.A. which had been engaged in the work was transferred to the Board's staff. In 1919 the

Board became a Ministry and the Fisheries Division a Department of it. Such, briefly, is the genesis of the present Fisheries Department.

The position of the Fisheries Department

It has been argued that the administration of fisheries suffers by the preponderance in the Ministry of agricultural interests and by the fact that important executive powers affecting the deep sea fisheries, which commercially are of overwhelming importance, are wielded by other Departments. Nevertheless, however haphazard may have been the development of the present system of administration, it does not in practice work badly. The Fisheries Department has developed into an expert department which, through its contact with and knowledge of the needs and difficulties of the industry, and through the gradual accumulation of information about the life history of fishes and of the circumstances which govern it, is able to exercise a far-reaching influence for the benefit of fishermen and fisheries. The Minister exercises, as we have seen, certain limited administrative and executive powers, but in general the functions of the Fisheries Department might be summed up in two words—intelligence and advocacy. It is the business of the Department to acquire knowledge of fisheries, fishermen, fishing and fish, to place this information at the disposal of executive departments as occasion requires and to move them to take action for the advancement of fisheries, or to desist from or to^{*} inhibit action which may be detrimental to them. In the exercise of it

functions under the Sea Fisheries Acts and the Conventions embodied in them and under the Merchant Shipping Act and of its various powers in connection with foreshores, harbours and navigation, the Board of Trade freely consults the Department and gives a ready ear to representations coming from or supported by it. The Admiralty seeks the advice of the Department as to the distribution of the Fishery Protection Cruisers and their seasonal activities; it is always ready, on request and so far as circumstances permit, to arrange for the special surveillance of a fishery where trouble is anticipated, and from time to time it assists the Ministry in its fishery investigations and experiments at sea. In every case of complaint of interference by foreign fishery cruisers with the legitimate operations of British fishing vessels—which, it must be remembered, fish off the whole of the coasts of Europe and the Continental shelf—the Foreign Office acts in close consultation with the Fisheries Department, and is generally guided by its representations. The Colonial Office refers to the Department inquiries from other parts of the Empire concerning fishery problems, and has recourse to the Department for assistance in connection with appointments to technical posts connected with fisheries in the Colonies. In matters affecting the pollution of rivers and estuaries the Fisheries Department and the Ministry of Health are in constant consultation. By-laws governing coastal rifle ranges, artillery ranges and bombing ranges which may interfere with the activities of fishermen are invariably

referred by the War Office and the Air Ministry to the Fisheries Department, and are commonly modified in the light of the Department's representations. Claims for compensation in respect of such interference and similar claims arising out of Naval activities are assessed by the Department. Questions affecting the protection of submarine cables bring the Department in contact with the Post Office and the cable companies. It is on the Ministry that falls the inspection of trawling gear, the assessment of claims in respect of gear cut away and abandoned to prevent injury to cables, and the verification of damage attributed to trawlers. In the case of coal, railway and transport strikes the Fisheries Department bears the brunt of the task of securing such protection of the interests of the fisheries as the circumstances permit, though it is through the Mines Department and the Ministry of Transport that such protection is actually given. The Department is, in short, regarded as the expert authority on all fishery questions, and it may be that acting in this capacity it is able to exercise as wide and strong an influence for the benefit of fisheries as it could if it embraced within itself all the executive powers which a Department of Fisheries might be expected to possess.

In this sense, that is to say as a department of intelligence and advocacy, the functions of the Department range over the whole field of fishing and bring it in contact with all Departments and Industries whose activities may either promote or retard the prosperity of the fishermen. And the field of fishing is a very wide one, embracing as it

does (1) deep sea trawling and lining, which are carried on by British vessels from Greenland, Iceland and the coasts of Norway and Russia in the North to the coast of Morocco in the South, and from the whole coast of Europe in the East to the limits of the Continental shelf in the Atlantic ; (2) the drift net herring fishery which in different seasons is prosecuted almost the whole year round at various points in proximity to the coasts of the British Isles ; (3) the inshore fisheries, which designation embraces the industry of the smaller craft employed in every form of fishing for swimming fish, for crustacea and for molluscs at no great distance from the coast ; and (4) the salmon and freshwater fisheries, prosecuted in rivers, lakes and estuaries. Corresponding functions, coupled, it may be added, with wider and more direct executive powers, are exercised in Scotland by the Fishery Board for Scotland between whom and the Fisheries Department intimate relations are maintained.

As it is in relation to the salmon and freshwater fisheries and the inshore fisheries that the Minister's responsibilities depend upon specific Acts of Parliament, it will be convenient briefly to refer first to those two branches.

Salmon and Freshwater Fish

No individual species of fish has been the object of so much legislation in the British Isles, or, it may safely be asserted, elsewhere, as the salmon. The Salmon Act of 1861 repealed, in whole or in part, 26 public Acts (of which the earliest was enacted

in the reign of Edward I) and 7 private Acts, and in 1923 no less than 19 Acts dealing partly or exclusively with salmon were operative in England and Wales. The provisions of these 19 Acts except such of them as were redundant, contradictory or obsolete are now all consolidated in the Salmon and Freshwater Fisheries Act of 1923, which is, as regards England and Wales, a code of the legislation affecting salmon and freshwater fish.

The underlying principle of this legislation is to entrust the conservation of the fisheries to local bodies, formerly known as Boards of Conservators, and now as Fishery Boards, representative of the various persons and bodies interested in the fisheries, in particular, of the riparian owners of fishing rights, of the County Councils, as custodians of the general public interest in the rivers, of the net fishermen who fish the public waters and now, as the result of the most recent legislation, of the holders of licences to fish with rod and line for fish other than salmon.

In England and Wales the rule, to which there are few exceptions, is that the right of fishing is public, and exercisable—subject to the payment of licence duty as regards salmon and trout—by all comers, as far as the tide flows, and it is with special regard to the preservation of these public interests that the Minister exercises his jurisdiction. Salmon spawn, and the young salmon spend the first two or three years of their life, in the upper waters of the rivers, after which they descend to the sea to grow and fatten. The salmon fisheries depend upon the annual run of mature fish

returning to the rivers to spawn, and to secure a good and steady annual run of salmon it is essential to permit a sufficient proportion of each year's run to reach the spawning beds at the head of the river and reproduce their species. To this end it is necessary so to regulate fishing as to enable a fair proportion of the fish to escape the nets, and the general policy is to discourage netting in narrow waters where the whole of the stream may be obstructed, and to enforce a minimum weekly close time during which all nets must be removed, and an annual close season during which all fishing for salmon is prohibited. During the open season the fish which elude the nets are subject to the risk of being taken by rod and line higher up the stream, but naturally there is no comparison between this risk and that involved in the passage through the netted area; it may, therefore, be confidently expected that the greater number of the fish that pass the nets will reach the spawning grounds, and there, unless they fall a prey to poachers, reproduce themselves and so maintain the stock.

In many respects, e.g. the prohibition of certain methods of taking fish, the requirement of fish passes to enable salmon and trout to surmount artificial obstructions, the requirement of a minimum close season, and, as regards netting for salmon, a minimum weekly close time, the conservation of fish is provided for by statute. But the statute also confers on Fishery Boards wide powers to make by-laws for the better conservation of the fisheries of their districts. These by-laws require the confirmation of the Minister, who may also by

Orders, which in certain circumstances, require confirmation by Parliament, modify many of the provisions of the Acts in their application to particular districts.

The Minister has actually more extensive statutory powers and duties in regard to salmon and freshwater fisheries than he has in regard to the commercially far more important sea fisheries. In the few watersheds where there is no Fishery Board—there are actually 45 such Boards—he can exercise many of the powers of a Fishery Board on his own initiative. Every fish pass required by statute to be erected and maintained must be approved by him as regards design and construction, as also must every grating built to turn salmon—and particularly smolts—away from dangerous channels. Every by-law and scale of licence duties requires his approval. He constitutes and can modify the constitution of Fishery Boards, and defines or modifies the definition of fishery districts by Orders—but this power he can only exercise on sufficient application—and, in a multitude of details of administration, he either must or may intervene.

It is a matter for melancholy reflection that, in spite of so much legislation aiming at the conservation of salmon and freshwater fish, and despite the activities and recommendations of many Committees and Royal Commissions, the salmon fisheries of England and Wales, potentially some of the most productive and valuable in Europe, and the trout and freshwater fisheries which, however insignificant as a source of food, are the means of wholesome

recreation for thousands of the poorer inhabitants of the country, have steadily declined with increasing industrialism. The salmon fisheries have in fact a considerable commercial value both as a source of food and a means of livelihood to working fishermen, and as a source of sport which, through the prices it can command, enhances the value of many properties and thereby contributes materially to county and other rates. The value of the fresh-water or coarse fish fisheries is of a very different character, but successive Ministers have rightly considered it their duty to endeavour to preserve the amenities of the rivers and the sport of the poorer class of anglers. The question of pollution, however, is one which concerns not merely fisheries but the public health in various aspects and the water supply not only of Urban populations but of villages and farms. Not a little of the time of the Fisheries Department is given to the endeavour to arrest the increasing pollution of the rivers by examining and drawing attention to the facts; but the ultimate success of its efforts will depend upon the extent to which it can enlist the support of the other Departments and interests primarily concerned.

The Inshore Fisheries

Just as between the Minister and the Salmon and Freshwater Fisheries stand Fishery Boards, so between the Minister and the Inshore Fisheries there stand the Local Sea Fisheries Committees. These Committees are Committees of County Councils appointed under the Sea Fisheries

Regulation Act, 1888, and their expenses are a charge upon the County rates.

There are 11 of these Committees, whose districts embrace the greater part of the coasts of England and Wales and of the territorial waters adjoining them. In addition, the powers of a Sea Fisheries Committee have been conferred on a number of Fishery Boards in respect of those parts of their districts which lie in estuaries or coastal waters, and also on certain harbour authorities. All such bodies have powers within their districts to make by-laws for the regulation and protection of their local fisheries. The by-laws require the confirmation of the Minister, which is only given after they have been advertised and after consideration of objections. If the objections are serious, a Public Inquiry is held locally before a decision is taken. The Minister alone, and, that only on sufficient application, can, by Order, constitute or vary a Sea Fisheries Committee or District. The Order has to lie before Parliament for thirty days and can, during this period, be abrogated by a resolution of either House. Each Committee must contain a number of members appointed by the Minister to represent the interests of the local fishermen, and his authority is required for certain acts, e.g. the expenditure of money on stocking or restocking a shellfish bed.

Such is the extent of the Minister's statutory authority and functions under the Sea Fisheries Regulation Acts: but he is also empowered to administer those parts of the Sea Fisheries Acts which relate to shellfish fisheries — particularly

Part III of the Act of 1868 and the Fisheries (Oyster, Crab and Lobster) Act, 1877,—and to make Orders conferring upon individuals, groups of individuals or public bodies a right of several fishery for shellfish in a defined area, or authority to regulate such fisheries. A number of such Orders are in operation. Every new Order has to be advertised and objections considered, and the Order requires confirmation by Parliament, or, in certain circumstances, by Order in Council.

Over and above the exercise of his statutory functions, the Minister exerts his influence in many ways for the protection and assistance of the inshore as of other fishermen. It is for the benefit of the inshore fishermen in particular that he intervenes in connection with artillery and bombing ranges ; his Inspectors are always on the alert to acquaint themselves with the needs of the industry and, in particular, the influence of the Department has been successfully exerted in suitable cases to secure funds from the Development Commission for building or improving small harbours for fishing craft. It is an invariable condition of such grants that the Ministry shall take responsibility for approving the plans of the harbours and supervising their construction.

Deep-sea Fisheries

When we come to the deep sea Fisheries, we find the administration largely coloured by their international character. We have to remember that the British fisheries are, for the most part, prosecuted in waters which are free to every nation—waters,

that is to say, lying outside the three mile belt of territorial waters. It is this fact that has necessitated the conclusion of International Conventions governing the conduct of fishermen at sea. The Conventions, incidentally, define the *limits within which the nationals of each country have the exclusive right of fishing, and in all Conventions to which Great Britain is a party the limit laid down is three miles from the coast, and, in the case of bays, three miles from a line drawn across the bay at the nearest point to the coast at which the bay is no more than ten miles wide. It is important to remember that this ten-mile bay line, as it is called, depends upon the Conventions and not on any rule of international law. Certain countries claim territorial jurisdiction beyond three miles from the coast, and Norway, in particular, claiming four miles not merely from the coast but, so far as her claims can be understood, from lines drawn between headland and headland however remote from one another, has refused to be a party to any of the Conventions, fearing to prejudice claims which she insists upon and Great Britain, in common with the principal maritime powers, does not admit. In the case of any country with which she has not entered into a convention for the regulation of fisheries, Great Britain claims the right of fishing to within three miles of its coasts, even in bays, except that in the case of bays not more than six miles wide she admits and claims territorial jurisdiction for

* Details concerning outlying islands, banks, etc., and slight variations between the terms of different conventions are omitted for the sake of brevity.

three miles seaward of the six mile line across the bay. Such conflicting claims and occasional harsh enforcement of regulations governing the behaviour of fishing vessels within admittedly territorial waters where the right of navigation, though not of fishing, is claimed, lead to disputes. Where the matter in dispute is governed by Convention, the Board of Trade is involved, and in all cases, whether governed by Convention or not, the intervention of the Foreign Office is as a rule called for.

The Conventions having defined the waters in which the fishermen of the respective countries enjoy the exclusive right of fishery, proceed to lay down regulations governing the conduct of fishing vessels outside those limits, the general purpose of which is to secure reasonable facilities for fishermen of the participating nations to pursue their legitimate calling in accordance with the particular method of fishing they are employing for the time being. It is largely because in such matters the British Government and not a Department concerned with this or that part of the United Kingdom addresses itself to the foreign Government concerned that the administration of the Conventions continues to be vested in the Board of Trade and their enforcement in the Admiralty; for the jurisdiction of these departments extends to the United Kingdom as a whole, while the jurisdiction of the Fisheries Department is confined to England and Wales, that of the Fishery Board for Scotland to Scotland, and that of the Government of Northern Ireland to Northern Ireland. The existing arrangements make also for economy

of administration, for the establishment of a Ministry of Fisheries exercising the powers in respect of fisheries at present exercised by the Board of Trade and the Admiralty would involve duplicating machinery which these two Departments must maintain for other purposes than the administration of Fisheries.

Scientific Research

The international character of the fisheries has its influence also on the conditions under which the scientific investigations of the department are conducted. Some of these investigations naturally relate to purely domestic problems, in particular, those which are directed to the investigation of the Salmon and Freshwater Fisheries and to Shellfish Fisheries. At Alresford a staff is engaged in the study of stream life with special reference to the effects of different forms of pollution upon it. For this purpose it investigates the ecology of different types of streams in their natural condition, and the influence on natural conditions of unnatural, accidental circumstances, and also conducts physiological tests in the laboratory of the effects of various industrial and sewage effluents on the fish.

At Conway the staff of the department has elaborated a successful method of cleansing mussels contaminated by sewage, which is being successfully operated on a commercial scale at the station and is capable in suitable circumstances of application elsewhere. It is generally known that molluscs living in polluted waters may take into their systems pathogenic bacteria which have no effect

upon them but may be transmitted by them to any person eating them, with serious results. The Ministry's system of cleansing removes this danger. At the same station experiments are being conducted with a view to finding means for similar cleansing of polluted oysters. For reasons which there is not space to elaborate here, the treatment applied to mussels needs modification in its application to oysters. At the same time experiments which, if successful, may have important commercial results, are being conducted in the breeding of oysters under control in tanks.

The greater part of the Department's scientific staff is, however, engaged in deep sea investigations, the general purpose of which may be said to be to discover the causes which govern the great fluctuations of the abundance of the principal food fishes which are revealed from time to time in the year's landings at the ports. These investigations are conducted for the most part in co-operation with the other fishing nations of Europe through the International Council for the Exploration of the Sea which has its headquarters in Copenhagen. The Council, upon which no less than 15 nations are now represented, was established in 1902. It consists of Delegates appointed by the Governments of the participating countries, each of whom may appoint two such delegates. At the Council Meetings the Delegates are accompanied by as many Experts as they think it necessary to bring with them.

There is not space in this chapter to discuss in detail the composition and work of the International

Council. The avowed object for which it exists is to secure the rational exploitation of the sea, which implies the utmost exploitation compatible with the maintenance of an adequate stock. With this end in view the various countries represented on the International Council are endeavouring, by co-operative effort, to obtain complete knowledge of the resources of the sea and of the conditions which govern their abundance. It can confidently be claimed that there has been in the past 25 years a very great advance in the acquisition of such knowledge, and that the Council as a body has largely contributed to it. The Council, however, does not itself prosecute research and does not maintain research vessels; the work is conducted by the participating Governments nationally, but directed by the Council internationally. That is to say, the Council lays down the programme of work and distributes it among the different countries according to the facilities afforded by their geographical positions, the machinery at their disposition and the aptitudes of their workers for the time being, in order that the enormous field of fishery research may be covered as effectively as possible and duplication and redundancy of effort may be avoided. The Council's programme, in which Great Britain plays an active part, embraces investigations of the life histories of the principal food fishes, of the food upon which they feed and of the environment in which they live. The sea is constantly changing as regards its temperature, its salinity, its chemical composition, and in other respects it varies from time to time and from place

to place. In order to obtain a thorough knowledge of the life histories of the various food fishes, it is essential to study closely the medium in which they live and the effect of changes occurring in that medium upon marine life, including the microscopic plant and animal organisms afloat or swimming in the water, the multitude of organisms mainly invertebrate, at the bottom of the sea, which provide a great part of the food of most of the food fishes of primary importance, and the food fishes themselves.

If these investigations were not conducted internationally, there would inevitably be a lack of co-ordination which would lead to waste of effort through redundancy in a field where economy of effort and a careful direction of energy are essential. For this reason if for no other, it is important that the deep sea investigations should be co-ordinated through an international organisation. There is, however, another reason, namely, that if, as is hoped, these investigations lead to results which can be put into practical application, it is essential that the application of them, whether it takes the form of regulation of fishing operations or, as is not inconceivable in certain cases, of cultivation of fish life in the sea, should have international support. All nations fishing the same grounds must be convinced of the usefulness of whatever measures it is proposed to adopt and, therefore, prepared to assist in and abide by them. This they will obviously be more ready to do if they have taken part in the investigations upon the results of which they are founded.

One other possible result of such investigations

is the eventual prognostication of good and bad seasons for different species of fish, or indication of the localities in which, from time to time, fishing is likely to be most successfully prosecuted. It cannot be doubted that as our knowledge of the life history of the fishes and of the circumstances which govern it increases, so will the economy and intelligence of fishing; and to Great Britain, the greatest sea fishing nation of the world, it must be an advantage to have the opportunity she enjoys through her position in the International Council, to play a part, and an important part, in the direction of the activities of the leading ichthyologists of Europe as well as of her own scientific workers.

It should be remarked, in passing, that there are other lines of scientific research which are of great importance to the fishing industry as a whole, particularly those which bear upon the problem of the preservation and transport of fish and the utilisation of fish offal. For assistance, however, in these lines of research, which are directly industrial, the Ministry relies upon the Department of Scientific and Industrial Research which has, in consultation with the Ministry, set on foot investigations in which considerable progress has already been made.

The Staff and its functions

The foregoing inevitably brief and imperfect sketch of the main preoccupations of the Fisheries Department may perhaps be brought into focus by reference to the functions of the component parts

of the staff, consisting of a small administrative and clerical staff in London, inspectors, fishery officers and collectors of fishery statistics stationed for the most part on the coast, naturalists with their main station at Lowestoft—for deep sea research—with a minor station, at Conway—for shellfish research—and another at Alresford—for freshwater fish research,—especially in relation to the effects of pollution—and a statistical staff stationed partly in London, for commercial statistics, and partly in Lowestoft, for statistics bearing directly on scientific research. The Chief Inspector, the Director of Scientific Investigations and the Chief Statistical Officer all have their Headquarters in London and, through them, the Administrative Staff is in daily communication with its technical and scientific advisers.

The coastal staff of inspectors and fishery officers, with their quarters in the chief fishery ports, are the eyes and ears and to some extent the mouth-piece of the department. Their task is to keep the Minister informed of the needs, the aspirations and the difficulties of the industry, to sift the evidence bearing on these and on reports which reach him from various sources, and, within limits, to interpret to the industry the policy of the Government and to amplify for their benefit, in conversation, the terse communications of official correspondence. In brief, they are the means of liaison between the industry and the Minister. It is their business also to keep touch with the officers of the Royal Navy engaged in the Fishery Protection Service, for a great deal depends upon happy

relations between the Ministry and the Royal Navy, which is able and willing, if properly advised, to give invaluable assistance to the ubiquitous fisherman.

Every Inspector and Fishery Officer on the coast has also under his protection a hinterland of inland fisheries, and is required to keep touch not only with the sea fisheries but also with the Fishery Boards of the rivers in his district, whether the subject of discussion be a new by-law or scale of licence duties, a fish pass, a grating, the appointment of representatives of rod fishermen or a case of industrial or sewage pollution.

The Naturalist Staff is engaged in researches which range from the investigation of the life histories of the principal deep sea fishes to the cleansing of polluted shellfish, the breeding of oysters and the reclamation of polluted rivers. For the most part the Fisheries Department, contrary to the practice of the Ministry as a department of agriculture, conducts its own researches instead of farming them out to independent scientific institutions. There are good reasons for this which cannot be elaborated here. Perhaps the most weighty of these is the international character which the greater part of the scientific research has necessarily assumed. But, while the Department assumes responsibility for economic researches—that is those definitely directed to the solution of economic problems—it encourages the prosecution by competent unofficial institutions of fundamental researches, by which is meant those which add to the sum of knowledge,

but are at the moment directed primarily to the acquisition of knowledge for its own sake. The greater part of the expenses of the Department's investigations, including the maintenance of a deep-sea research vessel based on Lowestoft, is borne by the Development Fund, from which assistance is given also, on the report of the Department, to institutions such as the Marine Biological Association, the Dove Marine Laboratory at Cullercoats and the Oceanographical Department of Liverpool University, conducting independent investigations of marine life.

Numerically, the most considerable branch of the Department is the Statistical Branch consisting of supervisory and clerical staffs in London and Lowestoft and of collectors of statistics whole-time or part-time in all the fishing ports except a few of the least significant. The collectors supply the bulk of the material from which the monthly returns of sea fisheries and the annual tables of statistics are compiled. Their work is supplemented by a small trained staff of fish measurers who work both in the market and on fishing vessels at sea. The statistics thus compiled serve a ~~double~~ purpose, giving, on the one hand, a monthly review of the quantities of fish landed and coming to market with its value according to the prices paid at the ports of landing, and an annual review of the year's fishing and other commercial details ; and, on the other hand, such information as to the intensity of fishing in various areas, the amount of fish taken in relation to the fishing power employed and analogous matters, as may enable a picture to

be formed of the fluctuations of the stock of fish in the sea, the causes of which it is the aim of the scientific investigations to reveal.

Early in this chapter it was suggested that the principal functions of the Department were intelligence and advocacy. An adequate intelligence is the essential condition of competent advocacy. Both in the apportionment and the distribution of its Fisheries Staff the Ministry has kept these functions in view, for the bulk of the staff is technical or scientific and has been placed where it finds itself in the closest possible proximity to the sea and to those who are engaged in exploiting its resources.

Chapter XVIII

KEW GARDENS

THE Royal Botanic Gardens at Kew are well known as one of the most delightful pleasure resorts near London, but it is not so generally known that the Gardens are also the headquarters of systematic botany for the whole British Empire and the scene of scientific work of great economic value.

The Gardens originated in 1760 when Princess Augusta, the mother of King George III, established a Physic Garden of nine acres in the grounds of Kew House, which she and her husband, Frederick Prince of Wales, held on lease. On the death of Princess Augusta in 1772, King George III bought Kew House and grounds, united them with the gardens of Richmond Palace, and appointed Sir Joseph Banks as Botanical Adviser. Under his direction collectors were sent all over the world to collect seeds and living plants and the foundations were laid of the work which has made Kew Gardens the depository of examples of every kind of plant. After the death of Sir Joseph Banks in 1820 there was a period of neglect and decline and on the accession of Queen Victoria in 1837 the abandonment of the Gardens as a botanical institution was seriously considered. Fortunately however it was decided to transfer the Botanic Gardens to the nation for scientific purposes in order to provide

for the culture of plants from all parts of the world, for the propagation of useful plants for distribution to India and the Colonies, for the instruction of the public and as a source of information for the Government on botanical matters. In 1841 Sir William Hooker was appointed Director of the Gardens which at that time only comprised 15 acres, but a few years later the Pleasure Grounds, which had been in the occupation of the King of Hanover, were added to the Gardens in order to form a National Arboretum or collection of hardy trees and shrubs. Subsequent additions were made in later years and the area of the Gardens at present is 288 acres. The Gardens were originally placed under the control of the Departments of Woods and Works, but since 1903 they have been in the care of the Ministry of Agriculture, though the Director, who is appointed by the Crown, and also acts as Botanical Adviser to the Secretary of State for the Colonies, corresponds direct with the Colonial, Foreign and India Offices.

As a place of public resort, Kew has been described as the most beautiful garden in the world. It is visited each year by over one and a half million people and there is no time in the year when a visit is not well repaid. For many years admission was free, but during the War a charge of 1*d.* a head was imposed in order to obtain revenue. This charge was removed by the Labour Government in 1924, but was re-imposed in the following year on the recommendation of the Estimates Committee of the House of Commons. It brings in a revenue of some £6,000 a year. A greater variety of plants

can be seen at Kew than anywhere else in the world, in spite of the fact that the soil is dry and sandy, and that the atmosphere is badly polluted by London smoke. Owing to this handicap a National Conifer Collection has been established in co-operation with the Forestry Commission at Bedgebury in Kent, where the trees have a better chance of successful growth than in the London area.

One of the most important functions of Kew Gardens is to illustrate the uses of plants generally and their value to mankind. This work is carried on in the four Museums of Economic Botany. Two of the Museums are devoted to Tropical and British timbers, and of the other two one illustrates the economic products derived from the Dicotyledons, such as cocoa, coffee, tea, cinchona, rubber and cotton, and the other the Monocotyledons, such as palms, bamboos, grasses, etc. from which are derived fibres as well as rice, sugar, sago, soap, ginger and vanilla. Closely associated with the Museums is the Herbarium, which contains the largest and the most completely organised collection in the world of dried specimens of plants. Between three and four million specimens have been classified and arranged, and the Herbarium makes it possible to identify correctly any plant sent from any part of the world. This is of great economic importance, as unless a plant has been accurately identified botanically there are serious risks in attempting to cultivate it for commercial purposes, since two varieties apparently alike may differ widely in economic value. The Herbarium

provides the material on which the botanical survey of the Empire is being carried out, and also the preparation of the great series of Colonial and Indian Flora on which Kew has been at work since 1863. These volumes, which provide a description and classification of all the plants growing within the British Empire, have been subsidised by the Indian and many of the Colonial Governments and constant additions and revisions are being made. The Flora of Canada still awaits attention, but Flora have been issued for Australia, India, New Zealand, Ceylon and several of the Crown Colonies ; Tropical Africa has been almost completed ; and West Africa is in progress.

As the botanical headquarters of the Empire, requests for advice are received at Kew from all parts of the world, more than 20,000 letters are dispatched each year, apart from the ordinary administration of the Gardens, and the inquiries range from the use of West African palm kernels for carving into coat buttons, to the value of a pithy stem as a material for a razor strop, or the best type of willow for making cricket bats.

The Imperial aspect of the work of Kew is perhaps best illustrated by what it has done to introduce new and valuable economic plants to our overseas possessions. In the words of Mr. Joseph Chamberlain, " it is not too much to say that there are several of our important Colonies which owe whatever prosperity they possess to the knowledge and experience of, and the assistance given by, the authorities of Kew Gardens."

Two notable instances are the introduction of

Cinchona, the source of quinine, from the Andes of South America to India, Ceylon, Jamaica and St. Helena, which was commenced in 1861, and the introduction of Para Rubber, *Hevea brasiliensis*, to India, Ceylon and elsewhere. This enterprise was started in the year 1873, when Dr. King, the Superintendent of the Calcutta Gardens returned to India with living plants of *Hevea*, which had been raised at Kew from seeds sent over from the Amazons, South America, by Mr. Clements Markham.

These two historic examples which have resulted in modern enterprises of immense value to the health of the residents in the Tropics in the one case, and to the financial welfare of Planters and Traders in the other, are but two cases out of many similar enterprises which have been carried out through the auspices of Kew since the establishment of the Royal Gardens in the eighteenth Century.

Shortly after Sir Joseph Banks was appointed Botanical Adviser to His Majesty King George III and became virtually Director of the Royal Gardens, Kew, the attempt to introduce the Bread fruit, *Artocarpus*, to the West Indies from the Pacific Islands was made by Captain Bligh, under the auspices of Sir Joseph Banks, which was thwarted by the mutiny of the *Bounty*, the ship which was prepared for the conveyance of the plants. A Kew Gardener was deputed to this ill-fated expedition, but a few years later Captain Bligh (in 1793), succeeded in introducing the Bread fruit to the island of Jamaica.

Nutmegs, Camphor, Cloves and other important

economic plants were also introduced, under the auspices of Kew, to the West Indian Colonies and to Mauritius, the Seychelles, etc. in these early days.

Not only did Kew suggest and arrange for such introductions, but Gardeners trained at Kew were sent out both to collect seeds and plants worthy of introduction and also to take charge of them in their new homes as Curators or Superintendents of the Botanic Gardens which were being established in our Colonies, largely owing to Sir Joseph Banks' influence and inspiration.

This policy was re-established and fostered by Sir William Hooker, when the Royal Botanic Gardens became a National Establishment under his Directorship in 1841, and has been continued without intermission to the present day by his successors in office.

Cinchona seeds were collected in the Andes of South America, by Mr. (*later* Sir) Clements Markham and sent to Kew, where a special greenhouse was built in 1860 for raising the seedlings. These seedlings were then sent to India and the plantations now existing there are the result of this original and of subsequent undertakings. When the experiment was undertaken it was costing the Government of Bengal alone £40,000 a year for quinine. Now a dose of 5 grains can be bought at any post office for a farthing. Cinchona was also sent to Jamaica and Trinidad, and in Jamaica plantations were made on the slopes of the Blue Mountains which flourished for many years but unfortunately now have been allowed to fall into neglect.

Cinchona was also introduced to St. Helena, an

island whose economic welfare has always been an object of special interest to Kew, but though the plants flourished at first, the soil and climatic conditions of the Island have not proved suitable for their culture.

Kew has also introduced to St. Helena in more recent times Sisal, New Zealand flax and other plants, which have been more successful.

The Island of Ascension has also been the subject of much attention from the Royal Botanic Gardens and, in co-operation with the Admiralty, Cork oaks, Evergreen oaks and various trees and shrubs and grasses have been sent to the Island and the present groves of trees and shrubs and the pastures are entirely due to the beneficent action of Kew.

Cork oaks were also sent from Kew to Australia, India and South Africa and acorns of our native oak and of the evergreen oak have been sent to South Africa and elsewhere at different times. From the oaks raised in South Africa from seed sent from Kew, acorns were sent over, at the end of the War, from South Africa to furnish oak trees for the South African Cemetery at Delville Wood, France.

The Tobacco industry in Jamaica, the cultivation of tea in Ceylon, Jamaica and Nyasaland, of onions in the West Indian Islands, Ipecacuanha in India and the Malay States, and Cacao in the Gold Coast, to select a few striking examples have either been suggested, helped forward or assisted by direct introductions from Kew. Every year mahogany seed is sent to India through Kew from the West Indies, and the valuable mahogany plantations in India are the result of these Kew introductions.

Kew was also instrumental in introducing *Eucalyptus globulus* to our West African Colonies and other British Possessions, as well as Teak and other valuable trees. Recently consignments of trees and seeds have been sent through Kew to the Falkland Islands, with the object of establishing a supply of trees to serve as wind breaks and as a source of fuel to these barren Islands, and so increase their amenities.

The introduction of Para rubber by Kew to the East, though it dates from 1873, was not really successfully accomplished until the years 1875-1877. It was in June 1876 that Mr. (now Sir Henry) Wickham arrived at Kew with 70,000 seeds collected on the Amazons which were all planted the day after their arrival. Only three per cent. of the seed germinated, but in August of that year 38 Wardian Cases, containing some 1,900 young plants, were sent to Ceylon in charge of a Kew Gardener. Since then young plants have been sent by Kew to the East and to other Colonies from which the flourishing plantations in the Federated Malay States and elsewhere have resulted.

Kew is also a School of Horticulture for the Empire. The student gardeners who come to Kew between the ages of 19 and 24 for two or three years after having had previous experience in private gardens are given a thorough botanical and horticultural education which fits them for appointments in Botanic gardens in any part of the Empire. In no other institution in this country can so much be learned as at Kew about the vegetation of the tropics and the proper method of cultivation of

tropical economic and other plants. The result is that Kew students are to be found in charge of practically all the Botanic gardens in the Empire as well as occupying many of the most important positions in the Colonial Agricultural Service.

Chapter XIX

THE ORDNANCE SURVEY

GREAT BRITAIN is the most completely mapped country in the world and this is due to the work of the Ordnance Survey, which is a sub-department of the Ministry of Agriculture and Fisheries.

The Survey may be said to have originated in the pacification of the Highlands after the defeat of the Young Pretender at Culloden in 1746. In order to open out the country, establish military posts and make roads, a map was necessary and the work was entrusted to William Roy, who, after holding a minor position in the post office in Edinburgh, became attached to the Army as Assistant Quarter Master, and subsequently attained the rank of Major General and became a Fellow of the Royal Society.

Roy may be regarded as the father of the Survey. Under his direction and with the help of soldiers a military sketch map of the Highlands was prepared, which was later extended to cover the whole of the mainland of Scotland. This map was on the scale of 1,000 yards to one inch, or 1 : 36,000, and the original field sheets and a manuscript reduction on a single sheet made by Roy are preserved in the British Museum.

The further progress of survey work was interrupted after 1755 by the French Wars, but Roy

continued to advocate a national survey and in 1784 he measured a base line of some five miles on Hounslow Heath in order to execute a triangulation to connect the observatories of Greenwich and Paris and establish their relative position. The measurement of the base line was made by glass tubes and Roy was assisted in the work by the President of the Royal Society and several distinguished volunteers, and by a small party of infantry specially detailed for the purpose. The operations were inspected by King George III, who defrayed the cost of a large circular theodolite for use in the triangulation, which instrument is still in the possession of the Ordnance Survey at Southampton. The terminals of the Hounslow Heath base line are marked by guns placed vertically in the ground, and arrangements have quite recently been made to protect them with railings and to ensure their permanent preservation as public monuments. The trigonometrical connection with Paris was completed in 1788 in co-operation with the French, and the triangulation from Hounslow to Dover Castle provided for the first time a reliable framework for map making and led to the formal establishment of the Ordnance Survey as a public Department.

Up to this time the survey operations had been carried on under the general direction of the Royal Society as a scientific enterprise, but in 1791 a trigonometrical survey of England was ordered by Parliament, and three artillery officers were seconded with special pay by the Board of Ordnance to carry out the work and produce for military purposes a map on the scale of one inch to the mile. Roy's base on

Hounslow Heath was remeasured and a network of triangles was carried over the country. A base of verification was selected on Salisbury Plain, the measured length of which was found to correspond closely with the length as computed from the triangulation. By the end of 1795 a double chain of triangles extended from London to Lands End, and a sufficient number of points were fixed in Kent and Sussex for the preparation of the one inch map, the first sheet of which was published in 1801.

From that date there was regular and systematic progress. By 1824 the whole of the south of England and part of Wales had been mapped on the one inch scale, but in that year the Government ordered a six inch map of Ireland, which was required for land valuation purposes. These maps proved so satisfactory that there was a demand for maps on the same scale in Great Britain, and in 1840 the Government ordered the north of England and the whole of Scotland, which had not been mapped on the one inch scale, to be surveyed on the scale of 6 inches to the mile.

The primary triangulation for the whole of the United Kingdom was completed in 1852, and in 1855 it was decided that the six inch map was not on sufficiently large a scale for all purposes, and that maps should be produced on the 25 inch scale (1 : 2500) for cultivated districts and on the scale of 10.56 feet (1 : 500) for towns of 4,000 inhabitants and upwards.

In 1863 it was decided to make a 25 inch map of the whole of the United Kingdom and this work was

completed for Scotland in 1882, for England and Wales in 1895 and for Ireland in 1914.

The 25 inch survey is the basis of all the Ordnance Survey maps. It provides for the whole country (except mountainous and waste regions) a complete series of cadastral maps, i.e. maps which give all the information necessary to determine property boundaries. The 25 inch map shows all the roads, railways, rivers, hedges, fences, houses, etc. and also the area of all enclosures accurately computed to the thousandth part of an acre. From the 25 inch maps all the maps on other scales are produced by reduction or enlargement. It is believed that no other country in the world has a complete cadastral map published and regularly brought up to date and available to the general public at a small cost.

The other maps are of a topographical character, i.e. they show ground forms by contours as well as topographical features, and a complete series of maps on different scales has been issued for the whole country. These maps include the 6 inch map which shows the same features as the 25 inch map, but does not give the areas of the enclosures. On the other hand it shows ground forms by contours and is therefore both a cadastral and a topographical map. Small scale topographical maps are published in various forms on the scales of one inch, half inch and quarter inch to the mile, and these maps are in considerable use for walking and motoring, and maps on the scale of 10 miles to the inch and 16 miles to the inch or 1/1,000,000 are published as wall or reference maps. In addition, enlargements of the 25 inch map are produced to order on twice the

scale, viz. 1/1,250. At one time maps of towns were made on the scale of 10 feet to the mile and of London on the scale of 5 feet to the mile, but these are no longer published or kept up to date unless the town is prepared to pay the cost.

The original work of the Ordnance Survey has been completed, but the survey once made requires constant revision as the face of the country changes. Prior to the War it was the practice to revise the 25 inch and 6 inch maps often enough to secure that no map remained unrevised for more than twenty years, but since 1919 the period of revision in the case of rural districts has been extended to 40 years. Urban areas are still revised every 20 years and the small scale maps are revised every 15 years. The extension of the period of revision for a large part of the country has enabled the staff of the Ordnance Survey to be largely reduced with a corresponding reduction of cost.

The field work and drawing of the large scale revision is carried out by the Field Divisions of the Survey which have local offices at Edinburgh, York, Norwich and Bristol. The headquarters of the Survey, at which the maps are printed, is at Southampton, to which it was moved in 1841 from the Tower of London in consequence of a fire which destroyed the Survey offices which were then associated with the Board of Ordnance. Up to 1870, the cost of the Survey was charged on Army Funds and was under the control first of the Master General and Board of Ordnance and then of the Secretary of State for War. After that date the cost was transferred to Civil Votes and placed under the

control of the Commissioners of Works till the creation of the Board of Agriculture in 1889 when it was transferred to the Minister of Agriculture.

But the military origin of the Survey still survives in many respects. The Director-General, who is the principal administrative officer, is appointed by the Minister of Agriculture subject to the approval of the Secretary of State for War, and he is always a distinguished officer of Royal Engineers, with (now) the rank of Colonel Commandant. A number of other Royal Engineer officers are employed in the principal directing posts and the staff as a whole consists partly of military and partly of civilians. The staff is partly technical and partly clerical. The clerical staff forms a departmental clerical class, which will in future be recruited by examination and open competition. The technical staff is recruited by selection at the age of 14 or 15 and receives its technical training on the Survey. Formerly the question whether these boys continued their service as civilians or enlisted in the Royal Engineers was left to individual choice. At the present time, however, owing to the fact that the Survey Companies have been allowed to fall much below their proper strength, in order to avoid discharge of civilians, it has been necessary to restrict engagement to those boys who are willing to enlist. The Royal Engineers, if their work and conduct continue to be satisfactory, pass the whole of their military service (21 years) on the Ordnance Survey, and on completion are re-engaged as civilians. The present staff consequently consists partly of Royal Engineers, partly of ex-Royal Engineers continuing to serve as

civilians, and partly of civilians who have not been through the Army.

The principal military function of the Ordnance Survey is the training of survey personnel for War. The total staff of the Survey is approximately 1,000, of whom 450 are normally serving soldiers organised in three Royal Engineer Survey Companies, though these Companies are temporarily below strength pending the occurrence of vacancies in the civil staff.

Now that the fundamental work of the Survey has been completed, the chief occupation of the Department is the revision and improvement of the maps, and their production for Government purposes and for sale to the public. The revision includes, besides the correction of topographical detail, the revision of all areas and levels, the verification and if necessary correction of names, and the correct delineation of local Government boundaries. A large amount of work is done for other Government Departments ; for the War Office, trigonometrical calculations and the drawing and printing of maps ; for the Geological Survey, the preparation and printing of geological maps from material supplied by that Survey ; and for various other Departments the production of special maps, diagrams, and illustrations.

In connection with the revision of levels mentioned above, a new primary levelling of England has recently been carried out. The original levelling of the country was done about 80 years ago (1840-60), but considerable advances have since that date been made in this science, and it was found that the old levelling did not come up to modern requirements.

The defects were briefly the absence of a proper system of fundamental bench-marks (i.e. bench-marks that are removed as far as possible from all possibility of disturbance); a defective connection with mean sea level; and inaccuracies in the levelling itself. The new levelling was carried out between 1912 and 1921. It is based on accurate determination of mean sea level, the result of six years' observations at a new tidal station at Newlyn. It includes a series of really permanent fundamental bench-marks, distributed over the country at distances of (on an average) 30 miles apart. The levelling was carried out according to the most modern methods, and fulfils the highest requirements of scientific accuracy.

Certain other scientific work which is engaging the attention of the Survey may be mentioned. For certain reasons into which it is unnecessary to enter here, it is considered desirable to change the projection of the small scale maps. The calculations for this purpose are now in hand. The revision of the Magnetic Survey of Great Britain and the Channel Islands was begun in 1925, and is being carried on according to a fixed programme (settled in conjunction with the Royal Society) each year. A Gravity Survey is projected, and will be begun this year (1927), in conjunction with Cambridge University and the Geographical Section, War Office.

The Central Bureau of the International 1/1,000,000 Map is situated at the Ordnance Survey, one of the officers of the Survey being the Secretary. This Bureau carries on correspondence with various

countries on the subject of the International Map, and prepares an annual report which is published at Southampton.

For many years the Ordnance Survey maps were produced by engraving on copper plates and either printed direct from the plates or transferred to stones or zinc plates for printing by lithographic methods. In recent years however engraving has been abandoned and the maps are drawn on paper and photographed, and from the negative a zinc plate is made from which the maps are printed. This process is known as helio zincography; it has the advantage of being much simpler, cheaper and quicker than engraving and transfer, while the result is, with due care, of the highest quality. The existing Popular Edition of the 1-inch map of England was produced by the old method (engraving and transfer); the new Popular Edition of the 1-inch of Scotland, now in course of publication, is being produced by drawing and helio-zincography.

The Ordnance Survey maps are sold mainly through some 200 agents all over Great Britain who are allowed a commission of $33\frac{1}{3}$ per cent. on the small-scale maps and of 25 per cent. on the large scale maps. The sales have increased considerably in recent years and now bring in over £50,000 a year. In addition the Survey is credited with the value of the work done for other Government Departments, principally the War Office, and it also receives royalties from private map publishers in respect of the use or reproduction of the Ordnance Survey maps in their publications. The net cost of the Survey after allowing for receipts from sales and other

appropriations in aid is approximately £150,000 a year. Since 1922 the work of the Ordnance Survey has been confined to Great Britain, the Irish survey having been transferred to the Governments of Northern Ireland and of the Irish Free State.

The work of drawing the maps for reproduction requires very accurate and clear draftsmanship, and the technical staff acquire a high degree of skill in their work. One of the civilian draftsmen wrote with a lithographic brush the Lord's Prayer eight times (comprising 579 words) in the space covered by a threepenny bit, and this feat was surpassed by an ex-Royal Engineer draftsman who, without the use of a glass, wrote with a lithographic pen the full Lord's Prayer nine times and the short Prayer once (comprising 687 words) on the same space. On reproduction by photography, examination under a microscope shows that each word and indeed each letter is clearly formed and is easily legible.

APPENDIX I

MINISTERS AND PARLIAMENTARY SECRETARIES OF THE DEPARTMENT

	<i>Ministers</i>	<i>Parliamentary Secretaries</i>	
1889	Mr. Henry Chaplin (later Viscount Chaplin).		
1892	Mr. Herbert Gardner (later Lord Burghclere).		
1895	Mr. Walter Long (later Viscount Long).		
1900	Mr. R. W. Hanbury.		
1903	Earl of Onslow.		
1905	Mr. Ailwyn Fellowes (later Lord Ailwyn).		
1905	Earl Carrington (later Marquis of Lincolnshire).	Sir Edward Strachey (later Lord Strachie).	1909
1911	Mr. Walter Runciman.	Lord Lucas.	1911
1914	Lord Lucas.	Sir Harry Verney.	1914
1915	Earl of Selborne.	Mr (later Sir) Francis Acland.	1915
1916	Earl of Crawford. Mr. Rowland Prothero (later Lord Ernle).	Sir Richard Winfrey. Duke of Marlborough. Viscount Goschen. Lord Clinton.	1916 1917 1918 1919
1919	Lord Lee of Fareham.	Sir Arthur Griffith Boscawen.	1919
1921	Sir Arthur Griffith Boscawen.	Earl of Ancaster.	1921
1922	Sir Robert Sanders.		
1924	Mr. Noel Buxton. Mr. Edward Wood (later Lord Irwin).	Mr. Walter Smith. Lord Bledisloe.	1924
1925	Mr. Walter Guinness.		

APPENDIX II

A Tribute from "Punch"

(April 20, 1927)

DEPARTMENTAL RHYMES

THE MINISTRY OF AGRICULTURE AND FISHERIES

(Reprinted by permission of the Proprietors of *Punch*)

The Ministry of Ag. and Fish
Does everything that one could wish
To foster, guide and chaperon
Those industries it calls its own ;
And it would be unkind to chaff
The members of its faithful staff
Who seek no rest and find no peace,
But labour always to increase,
By deeds of departmental derring
Corn, flesh and fowl and good red herring.

No slackness is allowed to smirch
Their splendid record of research,
No doubts molest their firm reliance
On methods blessed by modern science.
One expert, in his spacious lab.,
Observes the habits of the crab ;
Another takes his grain of wheat,
His whiting or his sugar beet
And tries by some ingenious test
What mode of living suits it best ;
While others dedicate their lives
To proving how the ploughman thrives

Who mitigates his dull vocation
With intellectual recreation,
And spends an hour of leisure daily
Playing upon the ukelele.

The farmer strolling round his paddock,
The fisherman in quest of haddock,
Unite to sing with grateful glee
The praises of their Ministry.
Rude simple souls, they lack that store
Of expert scientific lore
On which alone success depends,
And this their kind Department sends.
For, if calamities befall
The men who till, the men who trawl—
If beasts contract the foot-and-mouth,
If blizzards blow from north or south,
If prices slump and credit fails,
If nets are rent by sportive whales,
The Staff is ready in a trice
To help them with its best advice,
On land or sea, in drought or storm,
Sent free of charge in pamphlet form.

C. L. M.

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